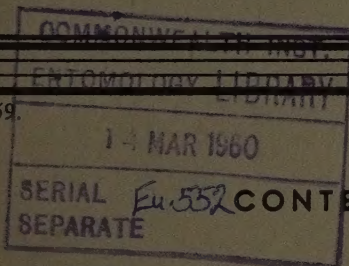


Entomologist's Gazette



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All communications to the Editor, 22 Harlington Road East, Feltham, Middlesex, England. Telephone Feltham 3740.

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NEWS AND VIEWS

We very much regret to record the death of H. D. Swain, M.A., F.R.E.S. Mr. Swain served on the editorial panel from 1951 until his death. He died suddenly whilst on his way to a collecting holiday in Corsica with his wife. Mr. R. L. E. Ford, one of the founders of the *Gazette*, is preparing an appreciation of the life of Mr. Swain and we shall publish this in a later issue.

In this issue we commence the publication of the new Check List of British Lepidoptera by I. R. P. Heslop. This list has been prepared with the help of Messrs. Tams, Bradley, Fletcher, and other members of the staff of the Entomological Department of the British Museum (Natural History), and the scientific names of the Macrolepidoptera are in accordance with the nomenclature being adopted in the new edition of South's Moths of the British Isles now being prepared by Messrs. F. Warne & Co. Ltd. We shall continue to publish this very important list in parts, and when it is completed (it will deal with the whole of the Lepidoptera and will probably be completed by the middle of 1961) we intend to reprint it for sale as a Label List on one side of superior paper.

Please note that Subscriptions for 1961 are now due. The subscription remains at £2 2s.—or £1 16s. if paid in advance, i.e. by the end of January or before the publication of the January issue, which ever is the later.

We should be glad to receive short collecting notes for publication. The winter is now on us and many of us have more time to write up such notes than we can spare during the collecting season. Short notes can usually be published fairly quickly as space can easily be found between the longer papers in which we mainly specialize.

RECENT LITERATURE

Mites, or the Acari, by T. E. Hughes, London, 1959. pp. viii; 225 (52 plates). Cloth. The Athlone Press. Price £2 2s.

A well-produced book by one of the foremost authors on a technical subject is bound to cause interest—but when the book covers a field so ill-provided with literature as this, its success is assured. Chapter headings reveal the width of the approach—The Free-living Acari: Associations with other Animals: Ectoparasitism: Endoparasitism: Mites as Plant Parasites: Mites as Vectors. There follow eight chapters on Anatomy, Physiology and Biology, and a final chapter on Classification. The line illustrations are excellent and the type-face, layout and imprint are of the highest order. The book will appeal to both specialist and amateur and will be a boon to the general naturalist whose library shelves will be greatly enriched by the mine of information contained. The price is reasonable, especially by comparison with that of many technical works appearing on the Continent of Europe to-day.

E. W. CLASSEY.

XYLOMYGES CONSPICILLARIS (L.) (LEP., CARADRINIDAE) IN LONDON

On the night of 14th/15th May, 1959, I was astonished to take at mercury vapour light in my garden here a male specimen of *Xylomyges conspicillaris* (L.). Examining the contents of my trap hurriedly and in the half light, I carelessly mistook the insect for the Pyralid, *Galleria mellonella* (L.).

According to Dr. de Worms, in his List *The Moths of London and its Surroundings*, p. 90, there seem to have been no records for the species in the London area this century, though he cites old records from Brentwood, Essex, and Dartford and Darenth Wood, Kent.

My specimen is of the form *melaleuca* View.

B. GOATER.

71 Grant's Close,
Mill Hill East,
London, N.W.7.

1958—A POOR SEASON IN WESTMORLAND

By THE REVEREND J. H. VINE HALL, B.D., A.K.C.

When one operates a mercury vapour light trap for the seventh year in the same place one cannot expect to take many species which one had not seen there before. Actually I was able in 1958 to add three species to the list of Macrolepidoptera which I have taken at Hutton Roof, two at the mercury vapour trap on the same night, and one by day on Hutton Roof Crag. On 5th July I saw a specimen of *Parasemia plantaginis* L., flying on the Crag. I could not catch it but there was no doubt as to its identity. I had often wondered why I had never seen the species here before, as it occurs so very widely in this area. It is good to know that it does occur on the Crag, though its numbers there must be very small for it to have escaped my notice previously. Then on 6th September, after the only really good night of the whole season, when it was warm, calm and humid here and violent thunderstorms were raging well to the south, I found in my trap two male *Eumichtis lichenea* Hübn., and one male *Celaena haworthii* Curt. The latter is more easily explained. It occurs on the Mosses at Witherslack and also on the high moorlands between Kendal and Sedbergh, so a flight of about nine miles could have brought it here. I know of no suitable habitat nearer than that. But apart from the report of an occasional stray specimen, the nearest known colonies of *lichenea* are near St. Annes-on-Sea, thirty-five miles to the S.S.W., where C. I. Rutherford reports the species as plentiful, and near Dalton-in-Furness, twenty-five miles to the west, where I can personally vouch for its occurrence. One can only wonder how it came about that two specimens found their way into my trap on the same night so many miles from suitable seaside haunts. So though I have added these two species to the Hutton Roof list, neither can be indigenous here, and I would seem to have exhausted the list of species which regularly occur in the immediate neighbourhood. This applies only to the Macrolepidoptera. An enormous amount of work would be required to prepare a list of other families, though a list of the Pyralidae is well on the way to completion.

The year as a whole has been disappointingly poor. A late, cold spring resulted in my seeing only six species of moths before 1st May, when I had the first reasonably good night of the year with the *Orthosia* species in evidence at long last. Throughout the year numbers were very low, except for *Noctua pronuba* L., whose vigour never seems to be impaired! Many species which I look upon as regular visitors were either not seen at all or were only represented by one or two examples. Altogether I managed to record 233 species of Macrolepidoptera during the year, almost all of which were in the trap, though some half dozen or so were only seen by day. My numbers for the years 1952-57 were 258, 270, 232, 251, 273 and

227. So 1958 was not quite the worst in numbers of species, but in numbers of individuals each year seems to be poorer than the preceding year, though I have simply not had time to count and record total catches throughout each year. My first complete season here, 1952, was very good, and, to take an example, I had 25 specimens of *Hadena bombycina* Hufn., in the trap one morning (23rd May). Since then its numbers have dwindled, until this year I never saw one. The same could be said of many other species, especially, one is sad to say, the more interesting ones. I rather gather that this experience of mine tallies with the experience of many others in different areas, and is part of a general fluctuation in numbers. One would like to hear some theories as to its possible causes.

Hutton Roof Vicarage,
Westmorland.
30th November, 1958.

VARIATION OF *EUCHLOË CARDAMINES* (L.) (LEP., PIERIDAE) AN INVALID NAME

By HAROLD B. WILLIAMS, Q.C., LL.D., F.R.E.S.

In *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957, p. 85, I described as ab. *decolorata* a form of *Euchloë cardamines* lacking the orange apical blotch.

I am indebted to Dr. B. J. Lempke of Amsterdam for calling my attention to the previous use of this name for an entirely different form of this species.

In *Rev. franç. Lepid.* 15:21 (1955) Carnel describes ab. *decolorata* with the following description:

'Femelle normalement dessinée dont les parties habituellement noires sont remplacées par du gris pâle.'

I have a series with the black apex, but not the discoidal spot, replaced by pale grey, which are presumably Carnel's form.

The name *decolorata* cannot stand for the form I described, and I therefore re-describe it as ab. *deaurata* ab. nov.

Male, with no trace whatever of the orange apical blotch above or below.

♂ holotype, Barnsley, 1906, taken by J. Harrison.

Figured *Proc. S. Lond. ent. nat. Hist. Soc.*, 1957, pl. 5, Fig. 1. H. B. Williams coll.

♂ paratype, Taunton dist. May, 1935, F. Ellis. H. B. Williams coll.

I regret the oversight, especially as I made a check with Mr. Goodson's help before writing the first description. As some time elapsed before publication I ought to have made a final check. However, I am glad to add the paratype, which I have since acquired.

THE PRESENT STATUS OF THE LILY BEETLE *LILIOCERIS LILII* (SCOP.) IN GREAT BRITAIN (COL., CHRYSOMELIDAE)

By B. J. SOUTHGATE

(Pest Infestation Laboratory, Slough)

Since the paper by Fox-Wilson (1943) very few records of this spectacular beetle have appeared in the literature. The main stronghold of the insect appeared from the records of Fox-Wilson to be that encompassed by the Bagshot Sands, namely Chobham, Windlesham and Virginia Water area. This area is composed of heath-land of an acid nature, with large areas covered by Pine. In 1954 a colony of these insects was brought to the notice of the writer in a garden at West End, Woking, Surrey. As many as forty insects were seen over a period of two-three weeks in June. As these beetles appeared quite suddenly on a small clump of lilies, which as far as could be ascertained had not been attacked before, it was interesting to speculate on the numbers which were present in the area. Were they on the increase? or had their numbers been maintained? To answer these questions satisfactorily presented a problem, as colonies might occur in small neglected gardens to which it would be impossible to gain access. In 1957 the beetles appeared on plants of *Lilium regale* and *Lilium henryi* in the writer's garden at Ascot. These bulbs have been growing for two years without attack from the beetle. How far these insects have had to travel from the nearest source of infestation is not known, but a local nursery who grow lilies lies about half to three-quarters of a mile away as the crow flies. It is obvious that smell plays a large part in the location of these insects with their food-plant, and this coupled with a reasonable egg production of some 300 eggs ensures that this species is able to maintain itself in this restricted area. That the insect has not extended its range to any great extent is interesting in so far as wartime neglect of gardens must have exposed numerous lilies to its ravages which would otherwise have received adequate control for any pests of this type. Much more needs to be known of the habits of this insect before the reason for its confined distribution is adequately explored.

In the accompanying table are set out the records of the occurrence of this beetle since Fox-Wilson's paper (1943). It will be observed that although the insect has occurred at two widely separated points, namely Flintshire and Dorset, the bulk of the records come from the Bagshot sands area or places bordering on to them.

Although Fox-Wilson recorded six species of *Lilium* as host plants, it would appear that almost all species would serve as suitable food. In the case of the writer's garden the first species to be attacked was a plant of *L. henryi*, which was in bud, although other species

such as *L. regale*, *L. tigrinum* and *L. tenuifolium* (= *pumilum*) were growing in the vicinity. Larvae have been reared on all of the foregoing species and on leaves of *L. auratum* and *L. candidum*.

ACKNOWLEDGMENTS

The writer wishes to express his thanks to the Royal Horticultural Society and to the Ministry of Agriculture, Fisheries and Food Plant Pathological Laboratory for permission to publish records sent to them; also to Mr. S. Wakely for records of his personal collections.

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TABLE I

<i>Date</i>	<i>Locality</i>	<i>Recorder</i>
1943	Sealands, Flintshire	G. Fox-Wilson
1944	Chobham, Surrey	G. Fox-Wilson
	Sunningdale, Surrey	G. Fox-Wilson
	Windlesham, Surrey	G. Fox-Wilson
1945	Virginia Water, Surrey	G. Fox-Wilson
	Chobham, Surrey	G. Fox-Wilson
	Chester, Cheshire	Steer
1945	Lightwater, Surrey	G. Fox-Wilson
	Virginia Water, Surrey	G. Fox-Wilson
	Chester, Cheshire	Cohen
1948	Ascot, Berks	G. Fox-Wilson
	Englefield Green, Surrey	G. Fox-Wilson
	Chertsey, Surrey	G. Fox-Wilson
	Cheshire	
1949	London, N.W.11	G. Fox-Wilson
1950	Sunningdale, Surrey	G. Fox-Wilson
1951	Bray, Berkshire	G. Fox-Wilson
	Chertsey, Surrey	G. Fox-Wilson
	Weybridge, Surrey	Royal Horticultural Society
	Addestone, Surrey	N.A.A.S., S.E. Reading
1953	Camberley, Surrey	R.H.S.
1955	Aldershot, Hants	R.H.S.
	Byfleet (Sheerwater), Surrey	S. Wakely
	Chobham, Surrey	S. Wakely
	West End Woking, Surrey	B. J. Southgate
1956	West End Woking, Surrey	B. J. Southgate
	Ottershaw, Surrey	S. Wakely
1957	Ascot, Berks	B. J. Southgate
	Chobham, Surrey	
	West End Woking, Surrey	B. J. Southgate

THE GENUS *CRAMBUS* F. (LEP., PYRALIDAE) IN SOUTH WESTMORLAND AND FURNESS

By THE REVEREND J. H. VINE HALL, B.D., A.K.C.

There can be few areas in Great Britain of comparable size more suited to moths of the genus *Crambus*¹ than South Westmorland and the Furness district of Lancashire. Yet as far as I know no paper devoted to the subject has ever been published. A. E. Wright read a paper in 1920 to the Manchester Entomological Society on the genus *Crambus* in Cheshire and Lancashire, and this was subsequently published in the Transactions of the Society for the years 1918, 1919, 1920 and 1921. Since most of his Lancashire records refer to Lancashire north of the Sands, that is, Furness, they are pertinent to the subject of this paper, but otherwise the material has been collected from personal observations by local collectors and from casual notes which have appeared from time to time. I am indebted to Dr. N. L. Birkett and Mr. John Heath for bringing the references concerned to my attention and for passing on to me their personal records of the genus in this area.

South Westmorland and Furness consists of very varied habitats in which some very local Crambids are to be found. There is a long coastline with salt marshes and sandhills, and limestone cliffs in places. There are many limestone hills—Hutton Roof Crag, Arnside Knott, Whitbarrow, and many smaller ones. There are low-lying Mosses, especially at Witherslack and Holker, and high moorlands in plenty further inland. There are Fells reaching between 2,500 and 3,000 feet in the southern part of the Lake District. So it is not surprising that the area supports as many as 18 out of the 26 British species of the genus. It is conceivable that one or two more will eventually be found here as a result of careful search. The eighteen species for which there are definite records are as follows:

1. *Crambus pinellus* L. Hutton Roof, occasionally at mercury vapour light (J.H.V.H.), Witherslack (J.H.V.H.). This species turns up in small numbers all over the area, but rarely are more than one or two specimens seen at any one time (N.L.B., J.H., A.E.W.).

2. *C. margaritellus* Hübn. Not uncommon on the high moorlands between Kendal and Sedbergh (J.H.V.H.). It has turned up as a wanderer at mercury vapour light at Hutton Roof, the nearest known locality being at Mansergh, eight miles to the north, with no suitable breeding ground nearby (J.H.V.H.). Particularly common on Holker Moss (J.H.V.H., J.H., A.E.W.). Probably occurs on most of the

¹ Classification according to Beirne, B. P., 1952, *British Pyralid and Plume Moths*.

Mosses; I beat a stray from juniper on 5.viii.1958 above the Moss at Witherslack, but found no trace of the insect on the Moss itself, though the specimen must have been blown up from the Moss.

3. *C. furcatellus* Zett. An established colony on the summit plateau of Red Screes at 2,500 feet (J.H.V.H., N.L.B.). A.E.W. says it is taken at Coniston Old Man, but had not seen it there himself. Doubtless on many of the higher Fells, and N.L.B. states that there are records for the hills above Langdale.

4. *C. perlellus* Scop. A wide variety of habitats: limestone hills at Witherslack, salt marsh at Far Arnside, sandhills at Sandscale Haws, near Dalton-in-Furness (J.H.V.H.). N.L.B. says 'common throughout', but I have found it very local and it seems not to occur round Hutton Roof. A.E.W. remarks on the bright silvery colour of some of the Grange examples, but normally the *warringtonellus* Stt. form predominates in this area.

5. *C. pratellus* L. Very common practically everywhere; recorded as such by all local collectors from a wide variety of different types of habitat.

6. *C. hortuellus* Hübn. Recorded as common in a wide variety of habitats by all local collectors, but I should say that on the whole it is more local and less numerous than *pratellus*. It frequently comes to my mercury vapour trap at Hutton Roof.

7. *C. dumetellus* Hübn. The only record is from Newby Bridge in June, 1949 (*Lancs. and Cheshire Fauna Report*, 1954, p. 46). One suspects that the species may have been overlooked elsewhere in the neighbourhood.

8. *C. ericellus* Hübn. A strong colony in a restricted area on Hutton Roof Crag, where it flies in company with large numbers of *Phothedes captiuncula* Treits. on an area of limestone turf with frequent outcrops of rock at an altitude of 700-800 feet, the dominant grass being *Sesleria coerulea* Ard. (J.H.V.H.). This is a most interesting and unusual habitat for a moth which is normally recorded from high heaths and moors at a much greater altitude in the mountains. Burton Fell (A.E.W.). This may refer to the same colony as the above, for on its western side Hutton Roof Crag drops down to the village of Burton-in-Kendal. On the other hand there may be at least one more colony on this extensive limestone Fell. G. H. E. Hopkins (1934, *Entomologist*, 67, p. 117) recorded this species from Burton Fell, and A.E.W. acted on this and took specimens himself. There are no records from any of the other limestone hills in the district, and one may well ask what *ericellus* is doing on Hutton Roof Crag at all. Nor do there seem to be records from the Lakeland Fells in the area under review, though it is recorded from Cumberland.

9. *C. uliginosellus* Zell. Grange and Holker (A.E.W., who took it with W. Mansbridge in 1919). There seem to be no other or more recent records. It needs to be looked for afresh.

10. *C. pascuellus* Linn. Holker and Witherslack Mosses (A.E.W., J.H., J.H.V.H., N.L.B.). This species appears to be seldom seen off the Mosses, but it does occur in damp slacks at Sandscale Haws, near Dalton-in-Furness (J.H.V.H.). It is also often to be seen on the limestone hill immediately to the east of the Moss at Witherslack (J.H.V.H.). One wonders if specimens get blown up there or if the species occurs there naturally in small numbers. It is certainly not normally to be seen on the limestone hills of this area.

11. *C. squalidalis* Hübn. (*salinellus* Tutt). Cark Salt Marsh 7.viii.1919 (A.E.W.). Also 1922 (W. G. Clutton). Grange Salt Marsh (A.E.W.). It must wander, for specimens appeared in Kendal at mercury vapour trap on 15.vii.1950 and 10.vii.1951 (N.L.B.). The paucity of records is presumably accounted for by the fact that this species is far harder to find by day than most other members of the genus.

12. *C. geniculeus* Haw. Humphrey Head (A.E.W.). Grange Salt Marsh, abundant August, 1918 (A.E.W., who failed to find it there again subsequently). Bardsea, near Ulverston, 1945 (N.L.B.). Hutton Roof, a regular but rather infrequent visitor to the mercury vapour trap, though I have not seen it by day (J.H.V.H.).

13. *C. falsellus* Schiff. Brigsteer, Meathop, Hale, Witherslack, and similar localities (N.L.B.). Humphrey Head (A.E.W., who says he never took it in the daytime). Hutton Roof, a regular but rather infrequent visitor to the mercury vapour trap, appearing in about the same numbers as the previous species: I have not seen it here by day, but did catch one at Witherslack in bright sunshine in July, 1958 (J.H.V.H.).

14. *C. latistrius* Haw. An established colony on the sandhills at Sandscale Haws, near Dalton-in-Furness (J.H.V.H.). Otherwise the only record from the area is a wanderer taken at mercury vapour light at Witherslack on 16.viii.1958 (N.L.B.).

15. *C. inquinatellus* Schiff. Several strong but strictly localized colonies on Hutton Roof Crag; frequent also at mercury vapour trap at Hutton Roof (J.H.V.H.). Far Arnside, on limestone cliffs by the sea (J.H.V.H.). Occurs widely over the area (N.L.B., J.H.). Fairly common, but taken singly as a rule (A.E.W.). But this last remark does not tally with my experience, particularly on Hutton Roof Crag, though I have taken isolated specimens at Witherslack and Arnside Knott (J.H.V.H.).

16. *C. selasellus* Hübn. A strong, but very localized, colony on the Salt Marsh at Far Arnside (J.H.V.H.) Cark Salt Marsh, 1921 (A.E.W.); also 1957 and 1958 (J.H.).

17. *C. tristellus* Schiff. Common in far too many localities to mention. Very frequent at mercury vapour trap at Hutton Roof over a long period in the autumn (J.H.V.H.).

18. *C. culmellus* L. Found everywhere from sea level at Arnside and other coastal localities to the very summits of the Lakeland

Fells. By far the commonest and most universal member of the genus.

In addition to the species recorded above there is an unconfirmed record by J. B. Hodgkinson of *C. contaminellus* Hübn. for Grange-over-Sands, which A. E. Wright thinks must refer in all probability to *squalidalis* Hübn. (*salinellus* Tutt). This record can obviously not be admitted at present. Of the remaining seven British species of the genus, *C. craterellus* Scop., and *C. verellus* Germ., and Zinck., are so extremely rare that they can be dismissed from the discussion, while *C. permutatella* H.-S. (*myellus* Hübn.), *C. fascelinellus* Hübn. and *C. chrysonuchellus* Scop., have known distributions which makes it extremely unlikely that they will be found here. There remain *C. silvellus* Hübn., for which there are records from the adjoining counties of Yorkshire and Cumberland, and *C. hamellus* Thunb., which is known to occur as far north as South Lancashire. It would not be at all surprising if either or both of these insects were to be discovered in this area. But even without further additions it will be agreed that South Westmorland and Furness are remarkably rich in species of this fascinating group.

In the above records A.E.W. refers to Albert E. Wright, N.L.B. to Dr. Neville L. Birkett, J.H. to John Heath, and J.H.V.H. to the author.

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Hutton Roof Vicarage, Westmorland.
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BOOK REVIEW

Insect Migration, by Dr. C. B. Williams, F.R.S., Collins's New Naturalist Series, 1958, No. 36, London. pp. xiii; 235, 48 figs., 16 black and white plates, 8 coloured. Price £1 10s.

By reason of the short life of insects and the difficulty in marking and identifying an individual insect, it is no easy matter to adduce evidence to prove that there is regular migration of many species of insects of several orders, and sometimes an outward and later a return journey. Dr. Williams has brought together a mass of information and records, and has triumphantly succeeded in his task of convincing the most sceptical. In the process he has written an exceptionally

interesting and very readable book of the high level that one has grown to expect of the New Naturalist series, and a book too that is a 'Must' not only for entomologists, but also for all who have an interest in Natural History.

Much care has been taken to ensure accuracy, and the errors that have been overlooked are of a trivial nature, such as the incorrect spelling of the name of Gervase Mathew.

I personally find it surprising that Dr. Williams limits the number of moths other than Sphingidae (Hawk moths) found in the British Isles that in his view are for certain migrants to twenty-two out of 150 suspected of migratory behaviour. He omits from this twenty-two species generally regarded as migratory, such as *Margaronia unionalis* Hübner and *Diasemia ramburialis* Dup. It would be interesting to know what evidence Dr. Williams thinks necessary in order to regard a moth as certainly a migrant.

On page 3 Dr. Williams states that for the purposes of his book migration is 'a continued movement in a more or less definite direction in which both movement and direction are under the control of the animal concerned. Often there is known to be a return flight to the original habitat, but I do not consider this an essential part of the definition'.

It has been said many times that fools rush in where angels fear to tread, and it is with diffidence that I suggest this definition is not altogether satisfactory when applied to migrant lepidoptera occurring in the British Isles.

How then should migration be defined? First, let us eliminate.

Migration need not be regular, though it might seem to readers of *Insect Migration* that it is more or less regularly repeated. It surely would not be argued that the unprecedented appearance of several *Hymenia recurvalis* F. in the south of England (Surrey, Dorset and Devonshire) on 5th September, 1951, and the following days was other than a migration. Yet this species has never been recorded in the British Isles before or since, nor, so far as I am aware, in France, Belgium, Holland or Denmark.

Migration is not a random dispersal in several directions from the area in which a species is breeding.

Nor is migration a long flight by a single insect, although such a flight would seem to be within Dr. Williams's definition. Migration, it is suggested, involves a number of insects starting at about the same time from the same area and flying more or less together, or, in some cases, possibly starting from varied areas, but in a broad sense assembling and flying over the same route more or less together. All very vague, but some examples may help.

The southern autumnal movement through passes in the Pyrenees is an example of insects which may well start from different areas and have convergent paths which ultimately lead them to follow the same route in a steady stream.

A more homely example is *Notodonta tritophus* Schiff. (Three-humped Prominent), which is fairly widely distributed as a breeding species over France and Belgium. At intervals of many years a single *N. tritophus* is recorded in England. These specimens caught in England have doubtless been accidentally carried or blown over from the Continent, or even flown over. They are commonly referred to as 'migrants', though not by Dr. Williams. They may be vagrants that have crossed the Channel on some random dispersal, but surely not migrants. If even a small number of this powerful large insect had from time to time at long intervals set out more or less together from the continent near the coast in the direction of England, I am convinced that the British records would be very different.

Compare the case of *Plusia ni* Hübn. (Ni moth), one of the twenty-two certain migrants. When a body migrates, the individuals tend to fan out. Hence in the August 1958 migration no less than three were recorded in the Scilly Isles on the night of 7th August, another in Essex on the same night, one in Gloucestershire on the following night, and others in Hampshire and in other parts of the south of England shortly afterwards.

I would like to suggest that for a flight to be migratory that flight must be of a distance in excess of the normal daily or nightly flight of the insect. This is to some extent covered in Dr. Williams's definition by the word 'continued'. But who knows what is the normal flight distance of many insects? The use of mercury vapour light has in recent years led to the belief that many species range naturally over much larger areas than was formerly thought to be the case. Thus, *Heliophobus anceps* Schiff. (Bordered Gothic) is generally regarded as an insect of chalk or limestone. Yet, every year, one or perhaps two find their way into my garden mercury vapour trap at Chiddingfold, which lies half-way between the North Downs and the South Downs, about twelve miles from the nearest chalk or limestone.

To define migration in anthropomorphic terms, I suggest that migration is the intentional and continued movement made by a number of insects, not necessarily of the same species or order, in the same area at about the same time in about the same roughly constant direction for an abnormally long distance.

This book will stimulate its readers to become observers and recorders of insect movements, and will stimulate existing observers to publicise their records. In consequence some of the many gaps in our knowledge of migration are likely to be filled, and Dr. Williams will probably consider this alone to be a sufficient reward for his book. But *Insect Migration* is far more: it is a book that will give pleasure to its many thousands of readers, and for many years will remain the authoritative general work on the subject.

R.M.M.

A COLLECTION OF FLEAS (SIPHONAPTERA) FROM SMALL MAMMALS IN THE SCOTTISH HIGHLANDS

• By R. S. GEORGE,¹ F.L.S., F.R.E.S., AND GORDON B. CORBET,² B.Sc.

INTRODUCTION

During October and November, 1955, and throughout much of 1956 and 1957, G.B.C. carried out extensive trapping of small mammals particularly in three localities in the Highlands, namely Sunart (North Argyll), Loch Tay (Perthshire), and Glen Clova (Angus). Smaller collections were made on the islands of Raasay and Mull (Inner Hebrides), at Monikie and Dundee (Angus), and Glen More (Inverness-shire). The primary object of the work was to obtain series of voles (*Microtus* and *Clethrionomys*) for a taxonomic

Table 1. List of Host-species

Host	English Name	Collected from	Number examined
<i>Microtus agrestis neglectus</i>	Field Vole	Mainland	762
<i>Microtus agrestis exsul</i>	Field Vole	Mull	25
<i>Clethrionomys glareolus britannicus</i>	Bank Vole	Mainland	231
<i>Clethrionomys glareolus alstoni</i>	Bank Vole	Mull	11
<i>Clethrionomys glareolus erica</i>	Bank Vole	Raasay	18
<i>Apodemus sylvaticus</i>	Wood Mouse	Mainland & Raasay	124
<i>Sorex araneus</i>	Common Shrew	Mainland & Mull	166

study. However, four species were trapped in considerable numbers as shown in Table 1. Trapping was done mainly by means of snap-traps, having a wooden platform as a trigger, which were set in runs wherever possible. No bait was used in order to minimise damage to the skulls. Normally 100 or 125 traps were used at a site, set in rows of 25 at five-yard intervals and with 25 yards between rows. They were usually examined and re-set once a day in the morning, but at some sites an extra visit was made in the evening.

In 1955 fleas were only collected casually when they were seen during the examination of the catch, but following upon suggestions by R.S.G., a standard procedure of collecting was subsequently adopted. On removal from the trap each animal was immediately placed in a polythene bag, which was then sealed with a rubber band. On arrival at base a few drops of chloroform were put in each

¹ Podsmead Place, Gloucester.

² Department of Biology, Sir John Cass College, Jewry St., London, E.C.3.

bag, and after a period ranging from ten minutes to several hours both animal and bag were carefully searched for fleas and other ectoparasites.

The figures given for degrees of infestation must be treated with caution since several factors which were not taken into consideration may have affected the number of fleas lost between trapping and collection of the hosts. Among these are weather (rainfall and temperature), contact with other animals and length of time between capture and collection. The 'flea index' used in Tables 3, 4 and 5 is explained in the caption to Table 5.

DESCRIPTION OF LOCALITIES

SUNART, ARGYLL

(1) Low ground. North shore of Loch Sunart, near Strontian, altitude 0-250 ft. Habitat—mostly Forestry Commission ground recently cleared from oak-wood, but with scattered oaks and birches remaining, newly planted with conifers. Ground cover mostly of the grass *Molinia coerulea* with patches of open bracken *Pteridium aquilinum* mostly very wet. All four host-species were present. Trapped 8-12.xi.55, 2-7.v.56, 20-26.vii.56, 16-25.x.56.

(2) High ground. Near summit of Ben Resipol, altitude 2,700 ft. Habitat—scree slopes with the moss *Rhacomitrium lanuginosum* dominant. Only one *Microtus* obtained. Trapped 9-14.v.56.

LOCH TAY, PERTSHIRE

(1) Low ground. North shore of Loch Tay, near Fearnan, altitude 400-600 ft. Habitat—Forestry Commission plantations, partly sitka spruce about six years old, mostly a mixture of larch, beech and sycamore about 15 years old. Abundant grass and bracken cover in both, ground fairly dry. All four host-species present. Trapped 27-30.x.55, 16-21.iv.56, 3-5.vii.56, 21-25.ix.56, 4-11.vii.57, 10-14.x.57.

(2) High ground. East slope of Meall Greigh (Ben Lawers range), 2,900-3,100 ft., 2-3 miles from low ground sites. Habitat—established block scree with blueberry *Vaccinium myrtillus* and mat-grass *Nardus stricta* dominant. *Apodemus* and *Clethrionomys* totally absent. Trapped 23-26.iv.56, 7-13.vii.56, 8-19.ix.56, 30.vi.-3.vii.57.

GLEN CLOVA, ANGUS

(1) Low ground. Entrance of Glen Doll, altitude 850-1,050 ft. Habitat—plantations of spruce and pine about six years old. Ground cover mostly grass, particularly *Molinia*. All four host-species present. Trapped 11-19.x.55, 30.iii.-4.iv.56, 15-17.vi.56.

(2) High ground. South and east faces of Cairn Broadlands, 2,500-2,700 ft., one mile from low ground sites. Habitat—steep slopes with strips of established scree. *Vaccinium* and *Nardus* dominant. No

Apodemus trapped. Trapped 15-16.x.55, 6-10.iv.56, 20-26.vi.56, 3-5.x.56, 12-19.ix.57.

MONIKIE, ANGUS (seven miles N.E. of Dundee)

Pitairlie Den, altitude 300 ft. Habitat—steep banks of dell containing stream. Bracken dominant, many trees and shrubs, ground very dry. All four host-species present. Trapped 12-22.vi.57, 1-4.x.57.

ABERNYTE, EAST PERTHSHIRE (10 miles W. of Dundee)

Ballo Hill, and Pitmiddle Wood. Altitude 700-800 ft. Habitat—plantations of 10-year larch, and edge of mature pine wood. All four host-species present. Trapped 30.v.-1.vi.56.

DUNDEE, ANGUS

Mayfield House. Altitude 150 ft. Habitat—edge of spruce plantation adjoining playing fields. Suburban. Trapped 30.viii.-4.ix.56.

GLEN MORE, INVERNESS-SHIRE

(1) Low ground. Glen More Lodge. Altitude 1,050 ft. Habitat—birch scrub with ground cover of grass, wet. Trapped 22-27.viii.57.

(2) High ground. North side of Cairn Gorm. Altitude 3,600-3,700 ft. Habitat—scree slopes, the rush *Juncus trifidus* dominant. No *Clethrionomys* trapped. Trapped 20-30.viii.57.

RAASAY, INNER HEBRIDES

Near Raasay House. Altitude 100-200 ft. Young conifer plantation. Ground cover of grass, heather *Calluna vulgaris*, low *Rhododendron* and bracken. There are no *Microtus* on the island. Trapped 21-25.iii.56.

MULL, INNER HEBRIDES

Glen Aros. Altitude 100-250 ft. Habitat—clearings in plantation of spruce and pine about 30 years old. Heather (*Calluna*) and *Molinia* dominant. All four host-species probably present but no *Apodemus* trapped. Trapped 31.vii.-6.viii.56

RESULTS

Eleven species of fleas were obtained from the four host-species and these are listed in Table 2. Tables 3, 4 and 5 summarise the collections. Unfortunately detailed data of the captures cannot be given, except in a few cases, as far too much space would be required, but the lists may be borrowed from either of the authors if desired. Since the numbers of animals trapped varied greatly, the average infestation figures for individual species of fleas for the year or covering all localities are of limited value, and valid comparisons can only be made between figures for each individual collection. However, by considering all the species of fleas together a few obvious trends emerge.

Table 2. List of Fleas Collected

	No. collected
<i>Hystrichopsylla t. talpae</i> (Curtis).	126
<i>Rhadinopsylla pentacantha</i> (Rothschild).	5
<i>Rhadinopsylla integella</i> (Jordan and Rothschild).	7
<i>Palaeopsylla s. soricis</i> (Dale).	106
<i>Doratopsylla d. dasyncnema</i> (Rothschild).	163
<i>Ctenophthalmus n. nobilis</i> (Rothschild).	632
<i>Ctenophthalmus n. vulgaris</i> (Smit).	
<i>Peromyscopsylla silvatica spectabilis</i> (Rothschild).	
<i>Malareus penicilliger mustelae</i> (Dale).	359
<i>Megabothris walkeri</i> (Rothschild).	115
<i>Megabothris rectangulatus</i> (Wahlgren).	320
<i>Nosopsyllus fasciatus</i> (Bosc).	15

From Table 3 it can be seen that *Sorex* is the most heavily infested, closely followed by *Microtus* and *Clethrionomys*. The figure for *Apodemus* is very much lower, but even so is probably exaggerated by comparison with the others since practically all the *Apodemus* were trapped during the night and consequently the average time elapsing before removal from the trap (in the forenoon) was shorter than in the case of the voles and shrews which are active day and night. The large differences shown to exist between collections of

Table 3. Summary of Infestation.

	LOW GROUND (below 1,100 ft.)			HIGH GROUND (above 2,500 ft)		
	No. examined	No. of Fleas	Flea index	No. examined	No. of Fleas	Flea index
<i>Sorex araneus</i>	121	205	169	45	64	142
<i>Microtus</i>	512	826	161	275	248	90
<i>Clethrionomys</i> *	232	340	147	10	2	(20)
<i>Apodemus</i>	124	109	88	2	2	—

Flea index = number of fleas per 100 hosts examined.

* Excluding Raasay.

the same species from high and low altitude reflect absence or extreme scarcity of certain species of flea on high ground rather than an all round reduction in numbers.

Table 4 shows how the degree of infestation varies with the sex and age of the hosts. The summer animals were divided into juveniles and adults on the basis of reproductive state. Some of the 'adults' will be young of the year which have just attained breeding condition (except in *Sorex*, where this never happens in the first year). During

Table 4. Sex and Age Differences.

	Spring adults (March-May)		Summer (June-August)				Autumn (Sept.-Nov.)	
	♂	♀	Juv ♂	Juv ♀	Ad ♂	Ad ♀	♂	♀
<i>Microtus</i>								
No. examined	46	49	109	53	74	73	210	168
% infested	81	63	50	38	76	62	41	40
Flea index	285	147	111	87	349	181	77	86
<i>Clethrionomys</i>								
No. examined	35	28*	12	19	29	14	57	64
% infested	77	43	67	24	62	57	44	30
Flea index	166	114	150	68	179	157	172	111
<i>Apodemus</i>								
No. examined	14	9	5	18	4	8	32	32
% infested	29	(33)	(40)	67	(50)	(25)	22	12.5
Flea index	43	(44)	(240)	267	(400)	(50)	41	12.5
<i>Sorex araneus</i>								
No. examined	27	10	16	35	9	6	31	18
% infested	70	30	81	69	(78)	(33)	32	33
Flea index	237	30	219	220	367	(67)	58	50

* Excluding one ♀ from Raasay with 45 fleas.

September the gonads regress and therefore no distinction is made. Caution must be exercised in comparing the figures for the different seasons, since often different localities are involved. *Microtus* and *Clethrionomys* agree in showing both juvenile and adult males to be considerably more heavily infested than the corresponding females during spring and summer. In *Clethrionomys* but not in *Microtus* this also applies to the autumn. In *Apodemus* there is a similar large difference in autumn, but numbers for the rest of the year are inadequate. In *Sorex* the spring and summer adult males are very much more heavily infested than the females, but in both summer and autumn juveniles there is little or no difference between the sexes.

In the voles the adults are consistently more heavily infested than the juveniles in both sexes, but in *Apodemus* and *Sorex* numbers are insufficient to be conclusive on this point.

The higher flea index for the adult voles could be explained by considering that adults live in old nests with an established breeding flea fauna, whilst many of the juveniles occupy recently made nests with a small flea fauna. However, this does not explain why adult males should have a higher flea index than adult females. Buxton (1948) mentions that it is probable that a mammalian sex hormone is necessary for full reproductive development of fleas. This in itself

would be a contributory explanation of the higher index for adults (with the modifying factor that more fleas are eaten by adult than by immature hosts, as was shown for mice by Buxton, loc. cit.), but if the sex hormone concerned is an androgen the higher index on males could be explained. This hypothesis needs experimental investigation. The high infestation of adult males might conceivably be of advantage in providing maximum dispersion of the fleas, but if so it still remains to be shown whether the high infestation is a consequence of some factor of the voles' ecology or is due to positive behaviour on the part of the fleas.

At Loch Tay a marked crash occurred in the population of voles between September, 1956, when they were exceedingly abundant both on low ground and high, and July, 1957, when both species of vole were very scarce, although the shrew and mouse population seemed to be unaffected. From Table 5 it can be seen that the flea indices for *Microtus* in September, 1956, were the lowest ever recorded throughout this study for low and high ground respectively. However, by the following July the index for low ground had increased six-fold, and that for high ground much more if the six voles trapped there were representative of the population. Moreover, on low ground this increase occurred in four separate species of fleas. By October, 1957, the vole population had recovered considerably and the flea index had dropped almost to the level of the previous autumn. In *Clethrionomys* the situation is complicated by the remarkable abundance of *M. penicilliger* in September, 1956. However, *C. nobilis* behaves as on *Microtus*. The numbers of *Apodemus* and *Sorex* are inadequate for detailed comparison, but the figures for *Apodemus* suggest an equally great increase in infestation (of *C. nobilis*). *Apodemus* did not appear to share in the population crash, but since *C. nobilis* is one of the common species on voles, it would be expected that the mice should acquire fleas originating from voles.

The increase in the flea index probably resulted either from the efflux of fleas from nests left unoccupied by the casualties of the crash, or by the survivors visiting vacant nests and acquiring the starving fleas, i.e. the flea population remained normal, at least for some time following the beginning of the crash, and therefore became more concentrated on the few remaining hosts.

The remaining results can best be studied by considering each species of flea separately (Tables 5 and 6).

Hystriechopsylla t. talpae (Curtis). This flea has been recorded from a variety of hosts, mainly voles, and was taken sparingly by G.B.C. on all species. It occurred most frequently on *Microtus*, whilst only a single specimen was taken from *Apodemus*. It was found in all the main areas, and in all except the high ground at Loch Tay showed a marked increase in abundance in the autumn by comparison with the other species. The Mull and Glen More specimens constitute

TABLE 5. SUMMARY OF INDIVIDUAL COLLECTIONS.

	SUNART					LOCH TAY										GLEN CLOVA						
	LOW				HIGH	LOW					HIGH					LOW		HIGH				
	'55	1956			'56	'55	1956			1957		1956			'57	'55	1956		'55	1956		
	Nov.	May*	July*	Oct.	May	Oct.	Apr.	July	Sept.	July	Oct.	Apr.	July	Sept.	July	Oct.	Apr.*	June*	Oct.	Apr.	June	Oct.
MICROTUS																						
<i>H. talpae</i> ...	(2)	0	2	25		(2)	4	0	16	48	40		6	3		(9)	11	2				
<i>R. integella</i> ...		0	0	2												(1)	7	0				
<i>P. sordicus</i> ...											3										7	
<i>D. dasyncnema</i> ...																	0	2				(1)
<i>C. nobilis</i> ...	(1)	170	43	58		(1)	100	71	35	224	10		3	5	(2)	(6)	129	69			53	
<i>P. silvatica</i> ...	(3)										3		0	3		(7)			(3)			(1)
<i>M. penicilliger</i> ...		110	50	14		(1)	15	19	15	60	0						28	4		(1)	13	(3)
<i>M. walkeri</i> ...	(3)	300	73	26			0	5	0	0			0	2								
<i>M. rectangulatus</i> ...					(2)	(1)	36	29	12	124	23	(5)	30	21	(38)	(7)	43	85			132	(2)
All fleas ...		580	168	125	(2)		155	124	78	456	80	(5)	39	34	(40)		218	162		(1)	206	(7)
% hosts infested ...		80	64	53			62	57	41	84	60		27	21			86	56			67	
No. hosts examined		10	44	57	1		47	21	68	25	30	6	33	149	6		28	51		2	15	6
CLETHRIONOMYS																						
<i>H. talpae</i> ...		0	0	12			0	0	4	0	12.5											
<i>R. pentacantha</i> ...						(1)†	3	0	2		0											
<i>R. integella</i> ...						(1)†					6											
<i>P. sordicus</i> ...						(1)†				8												
<i>C. nobilis</i> ...		45	78	0		(1)	46	(1)	36	162	19											
<i>P. silvatica</i> ...																						
<i>M. penicilliger</i> ...		55	26	4			23	0	204	131	69											
<i>M. walkeri</i> ...		0	0	8						8												
<i>M. rectangulatus</i> ...						(1)	40	(1)	29	38	31											
<i>N. fasciatus</i> ...							3															
All fleas ...		100	104	24		(5)	118	(2)	275	347	138											
% hosts infested ...		46	39	20			60		47	92	44											
No. hosts examined		11	23	25			35	4	45	13	16											
APODEMUS																						
<i>H. talpae</i> ...																						
<i>R. pentacantha</i> ...																						
<i>D. dasyncnema</i> ...																						
<i>C. nobilis</i> ...	(1)	29	71	0			(4)		0	(18)	29					(2)						
<i>P. silvatica</i> ...	(1)					(1)																
<i>M. penicilliger</i> ...																						
<i>N. fasciatus</i> ...																						
All fleas ...	(2)	29	71	0		(1)	(4)		0	(18)	29					(2)						
% hosts infested ...		14	21	0							17											
No. hosts examined		14	14	15			7	0	7	8	24						0	0				
SOREX ARANEUS																						
<i>H. talpae</i> ...				(1)					(2)	4		(1)		9		(2)						
<i>P. sordicus</i> ...		50	18	(1)		(1)	(2)			56		(4)		27		(1)		(7)			(35)	
<i>D. dasyncnema</i> ...		117	118	(2)		(1)	(4)			108		(1)		0		(5)	(1)	(23)			(17)	
<i>C. nobilis</i> ...		0	9	(1)						4	(2)					(2)		(1)			(1)	
<i>P. silvatica</i> ...																						(2)
<i>M. rectangulatus</i> ...																						
All fleas ...		167	145	(5)		(2)	(6)		(2)	172	(2)	(6)	0	36		(10)	(1)	(31)			(53)	(2)
% hosts infested ...		58	64							76				27								
No. hosts examined		12	11	7			7		5	25	9	6	1	11			6	10			8	1

The figures are flea indices (mean number of fleas per 100 animals examined) except those in brackets, which are actual numbers of fleas on ten hosts were examined making the flea index unreliable. The figures refer only to animals caught in snap-traps except the *Apodemus* at all live-trapped.

* Figures in these columns may be high owing to twice-daily collection from the traps.

† From Fortingal, Glen Lyon (3 miles from the Loch Tay sites).

‡ This represents 45 fleas of which 32 were on one animal.

Table 6. Sex-ratios of the Fleas

	Feb.—May			June—Aug.			Sept.—Nov.			Total		
	♂	♀	% ♂ ♂	♂	♀	% ♂ ♂	♂	♀	% ♂ ♂	♂	♀	% ♂ ♂
<i>H. talpae</i>	1	5	—	10	20	33	34	56	38	45	81	36
<i>R. pentacantha</i>	0	2	—	0	1	—	1	2	—	1	4	—
<i>R. integella</i>	1	1	—	35	38	48	2	2	—	3	4	—
<i>P. soricis</i>	14	7	67	59	50	54	4	8	33	53	53	50
<i>D. dasychnema</i>	31	9	78	111	179	38	8	6	57	98	65	60
<i>C. nobilis</i>	78	110	41	13	11	54	75	79	49	264	368	42
<i>P. silvatica</i>	5	4	—	44	75	37	31	48	39	49	63	44
<i>M. penicilliger</i>	35	56	39	25	34	42	60	89	40	139	220	39
<i>M. walkeri</i>	13	19	41	57	110	34	9	15	37	47	68	41
<i>M. rectangularatus</i>	27	30	47	57	110	34	46	50	48	130	190	41
<i>N. fasciatus</i>	1	0	—	—	—	—	3	11	21	4	11	27

the first records for the island and the county of Inverness-shire respectively.

[*Typhloceras poppei* (Wagner). This species was not collected, and in view of the large number of its preferred host (*Apodemus*) examined it seems fairly certain that it does not occur in the central Highlands. The recorded distribution on the mainland takes it no further north than Norfolk in England, Glamorgan in Wales and Co. Wicklow in Ireland, with no Scottish mainland records. However, it is known from several islands, namely Arran, Cumbrae, Lewis, St. Kilda, Fair Isle, Shetland, Clare and North Bull. So far as the mainland is concerned it is a southern species and its presence on the northern islands has to be explained.]

Rhadinopsylla pentacantha (Roths.). This was only taken from *Clethrionomys* and *Apodemus* and in such small numbers that negative records are of little significance. It is primarily a nest flea.

Rhadinopsylla integella (J. & R.). Only seven specimens were taken, from voles, at four separate low ground sites as follows:

Glen Clova, Angus: 1 ♀ from *Microtus*, 19.x.55; 1 ♀ from *Microtus* 30.iii.56, 1 ♂ from *Microtus*, 2.iv.56; Garth House, Glen Lyon, Perthshire (three miles from Loch Tay sites): 1 ♂ from *Clethrionomys*, 28.x.55 (these four have been recorded by George, 1956); Borland, Loch Tay, Perthshire: 1 ♀ from *Clethrionomys*, 10.x.57; Woodend, Loch Sunart, Argyll: 1 ♂ from *Microtus* 16.x.56; Glen More Lodge, near Aviemore, Inverness-shire: 1 ♀ from *Microtus*, 25.viii.57. These last two are new county records. The species was previously unrecorded from the British Isles and appears to be scattered thinly over the central Highlands. The records spread from late August to early April, indicating that this flea, like most members of its genus, occurs in the adult stage mainly in the winter. It is a nest flea and will not occur in numbers on the hosts.

Palaeopsylla s. soricis (Dale). This is a shrew flea, four of which were found on voles. It was found at all the main collecting sites and is new to the Mull and Inverness-shire lists. It was not found at Raasay, but no shrews were trapped there. It is equally abundant at high altitude, where it appears to be dominant over *D. dasyncnema*. The sex ratio shows a consistent fall from 67 per cent. males in spring to 33 per cent. in autumn.

Doratomylla d. dasyncnema (Roths.). This species is also typically found on shrews, although two casuals were taken from *Microtus* and one from *Apodemus*. It was taken at all the three main collecting sites and is the dominant low-level flea on shrews, being scarce on high ground (but fairly common on the high ground site at Clova, which, however, is quite close to the lower wooded slopes). This agrees with the work of Darskaya (1953) in Russia, where (in the Moscow region) *D. dasyncnema* was found to be restricted to wooded country, whilst *P. soricis* was ubiquitous. Although six shrews were collected on Mull, *D. dasyncnema* was not taken. It occurs mainly in

the spring and summer. This species and the last are the only ones having a large predominance of males at any time. In this species the percentage of males in spring is 78, falling to 54 and 57 later in the year.

Ctenophthalmus nobilis ssp. These fleas are dominant at low level on *Microtus*, *Clethrionomys* and *Apodemus*, but only occur casually on *Sorex*. On *Apodemus* they are the only common flea. On high ground they seem to be partially replaced by *Megabothris rectangularis* on *Microtus*, which was the only common rodent taken there. The numbers tend to fall off in late summer. The sex ratio for the year gave 42 per cent. males and fluctuated between 38 per cent. and 50 per cent. without showing any definite seasonal trend. Two subspecies of this flea are recognized but can only be separated in the males (Smit 1955). Their relative abundance is shown in Table 7.

Table 7. Subspecies of *Ctenophthalmus nobilis*.

	<i>C.n. nobilis</i>	<i>C.n. vulgaris</i>	Intermediate	% <i>nobilis</i>
Raasay	0	16		0
Mull	0	10		0
Sunart	0	46		0
Loch Tay, high	0	6		—
Loch Tay, low	1	107	1	1
Clova, high	0	5		—
Clova, low	13	38	3	24
Monikie	10	4		72
Abernyte	1	3		—
Dundee	11	4	1	73
Kingskettle, Fife	1	5	2	—
Glen More	1	1	1	—

It will be seen that *C. n. nobilis* (Roths.) is found with two exceptions only at the east coast sites, which is in accordance with the distribution established by Rothschild and Smit (1955). It has not hitherto been recorded from any of these counties, namely Angus, Perthshire and Inverness-shire. Wherever the two subspecies meet intermediate forms can be expected and were in fact found at five different localities.

Peromyscosylla silvatica spectabilis (Roths.). *Microtus* is the main host of this flea, which was however found casually on the other species. It was widespread, being found on both high and low ground. Its absence from Raasay may be correlated with the absence of *Microtus* there. On the mainland all the occurrences, except the early summer specimens from Abernyte and Monikie, were in the autumn, whereas the Mull specimens were taken in mid-summer. This high degree of infestation on Mull is very curious since it occurred only

a few days after extensive trapping of *Microtus* on the adjacent mainland at Loch Sunart had failed to produce a single specimen, although the species had previously been taken there.

Malareus penicilliger mustelae (Dale). This species was confined to voles with one straggler on *Apodemus*, and was found at all the main sites and also on Raasay and Mull, being new to the Mull and Inverness-shire lists. At Sunart it was twice as common on *Microtus* as on *Clethrionomys* and showed a marked decline in numbers during the summer and autumn. At Loch Tay it was much less abundant on *Microtus* throughout the season, but gave remarkably high infestation on *Clethrionomys* only in September, 1956. Unfortunately very few *Clethrionomys* were taken at this site in the preceding summer and figures for comparison were not obtained. The high figure for Raasay results from one animal which had 45 fleas, 32 of which were *M. penicilliger*. If this animal is omitted from the records, the Raasay figure for *penicilliger* becomes 91 per 100 hosts which is similar to the spring figure for *Microtus* from Sunart. The only trapping site at which this species was not obtained (apart from Abernethy and Dundee, where few or no voles were caught) was on the high ground at Loch Tay, and it may be significant that this is the only site from which *Clethrionomys* is known to be totally absent (almost 200 *Microtus* were trapped). The fact that *M. penicilliger* is found at considerably greater altitude (3,600 ft.) on Cairn Gorm (only *Microtus* and *Apodemus* were trapped there, but trapping was inadequate and *Clethrionomys* are known to occur nearby at 2,500 ft.), suggests that its absence from Meall Greigh may be due to the absence of *Clethrionomys* rather than to physical factors such as climate. However, it should be pointed out that in the Outer Hebrides *M. penicilliger* is found on North Uist, where *Microtus* is apparently the only vole, but not on Lewis, where there are no voles at all (Elton, 1936).

Megabothris walkeri (Roths.). This is another *Microtus* flea of which a few were taken on *Clethrionomys*, but none at all on the other species. It was abundant at Sunart and Mull, scarce at Loch Tay (this is a new county record), and absent from all of the more easterly trapping localities. It was the dominant flea at Sunart in spring and summer, but the population was reduced considerably by autumn. On Mull it was equally dominant with *C. nobilis*.

[*Megabothris turbidus* (Roths.). This species was not found throughout the work, thus giving support to Smit's (1957a) contention that it does not occur in Scotland.]

Megabothris rectangularatus (Wahlgren). This is a vole flea which is most abundant on *Microtus*. Only one straggler was found on *Sorex* and none on *Apodemus*. It is found in Scandinavia, Russia, S.E. Europe and in the Alps. It was introduced to the British list by Rothschild (1936) and the total previous British records consist only of six from Scotland and one (which needs confirmation) from

Devon (Smit, 1957b). In the present collections it is widespread, but is totally absent from Mull and Raasay and, very significantly, from the low ground at Sunart, although the only two fleas collected from high ground there were of this species. It is the dominant species on high ground at Loch Tay and Clova, but is also found commonly on low ground in the east. It must therefore be considered quite a common flea in the central Highlands. Dunnet (1950) recorded it from sea-level sand dunes up to 1,600 ft. in Aberdeenshire, but it has now been found up to 3,000 ft. on Meall Greigh. It seems possible that an important immediate factor in the distribution of this species is competition with *M. walkeri*, which has hydrophilic tendencies but, apparently, a much lower tolerance to altitude. On *Microtus* taken on high ground this flea is largely dominant over *C. nobilis*, which is the commonest British flea on *Clethrionomys*, *Microtus* and *Apodemus*. Similarly the closest relative to *C. nobilis*, the *Ctenophthalmus agyrtes* complex with which it makes a super-species pair, is extremely common on the same hosts over much of Europe. That it exhibits this dominance over a flea which is so successful elsewhere under the entire range of ecological conditions throughout its distribution suggests that the main distributional limitation of *M. rectangulatus* in the British Isles is the Central Lowlands Plain. Otherwise we see no reason why *rectangulatus* should not exist on high ground in the Southern Uplands and the Pennines.

Nosopsyllus fasciatus (Bosc). This is the common rat flea and was here found mainly on *Apodemus*, with one straggler on a *Clethrionomys* at Loch Tay. It was only abundant at Dundee (on *Apodemus*), which was the only site close to human habitation.

OTHER RECORDS

A few records of mammal fleas were obtained other than on the four host-species already considered, as follows:

MOLE (*Talpa europaea*). Glen Clova, Angus: 1 ♂ trapped on 15.vi.56 had 2 ♂ *Palaeopsylla minor minor* (Dale) and 1 ♀ *Ctenophthalmus bisoctodentatus occidentalis* Smit; a nest excavated on 10.vi.56 contained 1 ♂ and 2 ♀ *Hystriehopsylla talpae*, 2 ♂ and 3 ♀ *C. bisoctodentatus*, 6 ♂ *Ctenophthalmus n. nobilis*, 9 ♂ *C. n. vulgaris*, 1 ♂ hybrid and 18 ♀♀. The *P. minor* is new to Angus. Kingskettle, Fife: a nest excavated on 6.iv.58 had 1 ♂ *C. n. nobilis*, 5 ♂ *C. n. vulgaris*, 2 ♂ hybrids and 25 ♀♀, all three forms being new to the county.

HEDGEHOG (*Erinaceus europaeus*). Dundee, Angus: one juv. ♂ on 26.x.57 had 14 ♂ and 27 ♀ *Archaeopsylla e. erinacei* (Bouché), a new county record.

[PYGMY SHREW (*Sorex minutus*). Three specimens examined were uninfested.]

WATER SHREW (*Neomys fodiens*). Loch Tay, Perthshire: a juv. ♀ trapped on 14.x.57 had 1 ♀ *Hystrichopsylla talpae*.

RABBIT (*Oryctolagus cuniculus*). Sunart, Argyll: one found dead on 21.x.56 had 6 ♀ *Spilopsyllus cuniculi* (Dale) in the ears. Clova. Angus: one found dead on 19.ix.57 had 1 ♂ *S. cuniculi*.

HOUSE MOUSE (*Mus musculus*). Dundee, Angus: juv. ♂ trapped outdoors on 4.x.55 had 1 ♀ *Nosopsyllus fasciatus*; ad. ♀ on 16.xii.56 had 1 ♀ *Leptopsylla segnis* (Schönherr).

BROWN RAT (*Rattus norvegicus*). Monikie, Angus: ad. ♂ on 22.xi.57 had 1 ♂ *Ctenophthalmus n. nobilis* and 1 ♂ *C. n. vulgaris*; juv. ♀ on 2.xii.57 had 1 ♀ *Nosopsyllus fasciatus*.

MAN. Clova, Angus: 20.vi.56, 1 ♀ *Monopsyllus s. sciurorum* (Schränk).

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MOTHS OF A PORTSMOUTH GARDEN—

A FOUR-YEAR APPRECIATION

By J. R. LANGMAID, M.B., B.Chir.

Portsea Island is about fourteen square miles in area. Space is very precious, and there are very few large gardens—ours is not one of them. There is a certain amount of waste ground on the eastern side, but the rest of the island is packed with houses, most of which have practically no garden at all.

During the past four years I have had my mercury vapour trap out in the garden on any suitable night that I have been home, and this amounts to about fifty or sixty nights per year. This being so, it will be appreciated that my study of the moths visiting the garden can, at the best, only be sketchy. However, in spite of the paucity of vegetation, I have so far noted 219 species of moths in the garden.

There is a small marsh about three miles away from the house, and another larger one about six miles away on the mainland; it is probably from here that the occasional specimens of *Nonagria sparganii* Esp., *Coenobia rufa* Haw., *Arenostola phragmitidis* Hübn., *Rhizodra lutosa* Hübn., and *Leucania favicolor* Barr., come. It seems to me that this is a considerable distance for these very local moths to wander.

About a mile from the house there is a small colony of *Eupithecia millefoliata* Rossl., living an excruciatingly precarious existence on an Admiralty dumping ground and its environs, and very occasional specimens turn up in the trap. I do not know if this moth has established itself further west than Portsmouth, and would be grateful for any information on the subject.

Apart from occasional rarities such as *Leucania unipuncta* Haw. in 1954, and *Cryphia divisa* Esp. in 1955, Portsmouth does rather poorly for migrants. I always feel that the migrants which come in our direction either land on the Isle of Wight, which is both on and in the way, or else pass over the rather unsightly town of Portsmouth and come down on the much more interesting hinterland of Portsdown Hill to the north of the harbour. It also seems that the coasts of Kent and Sussex in the East, and Devon and Cornwall in the West are the areas of maximal fall-out, as it were, and that 'Central Southern England' gets merely a sprinkling. Nevertheless *Plusia gamma* L., bless its heart, is always in evidence, and *Macroglossum stellatarum* L. is seen every year in larger or smaller numbers. *Nycterosea obstipata* F. turned up in 1955 and 1956, but has not honoured us with its presence since then. A single *Heliothis peltigera* Schiff. condescended to visit me in May, 1958, and although this would not be an excessively noteworthy capture to most South Coast collectors, to me it was wonderful.

I get a smaller number of moths in the trap than most people, even those who live in towns. A really good summer night usually produces somewhere around 200 moths, and on one occasion I actually topped 500, but that was when four-fifths of the catch was *Plusia gamma*!

Of the list of moths which follows, the vast majority will be found in any garden in Southern England, but there may be something of interest in it for someone.

"Blechynnden", 9 Craneswater Park,
Southsea, Portsmouth.

SPHINGIDAE

<i>Mimas tiliae</i> L.	Fairly common
<i>Laotoë populi</i> L.	Fairly common
<i>Smerinthus ocellata</i> L.	Fairly common
<i>Deilephila porcellus</i> L.	One in 1957
<i>D. elpenor</i> L.	Rare
<i>Macroglossum stellatarum</i> L.	Usually fairly common

NOTODONTIDAE

<i>Cerura vinula</i> L.	Not common
<i>Notodonta dromedarius</i> L.	Rare
<i>Phalera bucephala</i> L.	Scarce
<i>Clostera curtula</i> L.	One in 1957

THYATIRIDAE

<i>Habrosyne pyritoides</i> Hufn.	Scarce
<i>Tethea ocularis</i> L.	Not common

LYMANTRIIDAE

<i>Orgyia antiqua</i> L.	Fairly common
<i>Dasychira pudibunda</i> L.	Fairly common
<i>Euproctis similis</i> Fuess.	Rare

LASIOCAMPIDAE

<i>Malacosoma neustria</i> L.	Fairly common
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DREPANIDAE

<i>Drepana binaria</i> Hufn.	Scarce
<i>Cilix glaucata</i> Scop.	Common

NOLINAE

<i>Nola cucullatella</i> L.	Fairly common
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ARCTIINAE

<i>Spilosoma lubricipeda</i> L.	Very common
<i>S. lutea</i> Hufn.	Very common
<i>Cynia mendica</i> Clerck	Scarce
<i>Phragmatobia fuliginosa</i> L.	Common
<i>Arctia caja</i> L.	Very common
<i>Callimorpha jacobaeae</i> L.	Common
<i>Cybosia mesomella</i> L.	Rare

LITHOSIINAE

<i>Eilema lurideola</i> Zinck.	Fairly common
<i>E. complana</i> L.	One in 1955
<i>E. sororcula</i> Hufn.	One in 1958

AGROTIDAE

<i>Apatele aceris</i> L.	Common
<i>A. megacephala</i> Schiff.	Common
<i>A. psi</i> L.	Common
<i>A. rumicis</i> L.	Common
<i>Cryphia perla</i> Schiff.	Very common
<i>C. muralis</i> Forst.	Common
<i>C. divisa</i> Esp.	One in 1955
<i>Agrotis segetum</i> Schiff.	Common
<i>A. vestigialis</i> Hufn.	Rare
<i>A. puta</i> Hübn.	Very common
<i>A. exclamatoris</i> L.	Abundant
<i>A. ipsilon</i> Hufn.	Common, abundant in 1955
<i>Euxoa nigricans</i> L.	Common
<i>E. tritici</i> L.	Common
<i>Lycophotia varia</i> Vill.	Fairly common
<i>Peridroma porphyrea</i> Schiff.	Fairly common
<i>Amathes baja</i> Schiff.	Rare
<i>A. c-nigrum</i> L.	Abundant
<i>A. triangulum</i> Hufn.	Rare
<i>A. sexstrigata</i> Haw.	Rare
<i>A. xanthographa</i> Schiff.	Very common
<i>Diarsia festiva</i> Schiff.	Fairly common
<i>D. rubi</i> View.	Very common
<i>Ochropleura plecta</i> L.	Very common
<i>Axylia putris</i> L.	Fairly common
<i>Euschesis comes</i> Hübn.	Common
<i>E. janthina</i> Schiff.	Common
<i>E. interjecta</i> Hübn.	Scarce
<i>Noctua pronuba</i> L.	Abundant
<i>Lampra fimbriata</i> Schreb.	Fairly common
<i>Mamestra brassicae</i> L.	Common
<i>Melanchra persicariae</i> L.	Common
<i>Ceramica pisi</i> L.	Scarce
<i>Diataraxia oleracea</i> L.	Very common
<i>Hadena w-latinum</i> Hufn.	Fairly common
<i>H. suasa</i> Schiff.	Not common
<i>H. thalassina</i> Hufn.	Fairly common
<i>H. trifolii</i> Hufn.	Common
<i>H. bicurris</i> Hufn.	Common
<i>H. cucubali</i> Schiff.	Fairly common
<i>H. lepida</i> Esp.	Fairly common
<i>H. serena</i> Schiff.	Fairly common
<i>Tholera popularis</i> F.	Fairly common
<i>T. cespitis</i> Schiff.	Scarce
<i>Bombycia viminalis</i> F.	Scarce
<i>Luperina testacea</i> Schiff.	Common
<i>Thalpophila matura</i> Hufn.	Fairly common
<i>Procus strigilis</i> Clerck	Very common
<i>P. latruncula</i> Schiff.	Common
<i>P. fasciuncula</i> Haw.	Fairly common
<i>P. literosa</i> Haw.	Common
<i>P. furuncula</i> Schiff.	Common
<i>Apamea infesta</i> Ochs.	Scarce
<i>A. remissa</i> Hübn.	Common
<i>A. sordens</i> Hufn.	Common
<i>A. secalis</i> L.	Common
<i>A. crenata</i> Hufn.	Rare

<i>A. lithoxylaea</i> Schiff	Common
<i>A. monoglypha</i> Hufn.	Common
<i>A. scolopacina</i> Esp.	One in 1955
<i>A. ypsillon</i> Schiff.	Fairly common
<i>Dypterygia scabriuscula</i> L.	One in 1955
<i>Aporophyla lunula</i> Ström.	Scarce
<i>Euplexia lucipara</i> L.	Common
<i>Phlogophora meticulosa</i> L.	Common
<i>Naenia typica</i> L.	Common
<i>Hydraecia oculea</i> L.	Common
<i>H. paludis</i> Tutt.	Common
<i>H. micacea</i> Esp.	Common
<i>Gortyna flavago</i> Schiff.	Scarce
<i>Nonagria sparganii</i> Esp.	One in 1957
<i>Coenobia rufa</i> Haw.	One in 1954
<i>Arenostola phragmitidis</i> Hübn.	One in 1955
<i>Rhizodra lutosa</i> Hübn.	Scarce
<i>Leucania pallens</i> L.	Very common
<i>L. favicolor</i> Barr.	Scarce
<i>L. impura</i> Hübn.	Common
<i>L. comma</i> L.	Common
<i>L. unipuncta</i> Haw.	One in 1954
<i>L. lythargyria</i> Esp.	Common
<i>L. conigera</i> Schiff.	Fairly common
<i>Meristis trigrammica</i> Hufn.	Common
<i>Caradrina morpheus</i> Hufn.	Common
<i>C. blanda</i> Schiff.	Very common
<i>C. alsines</i> Brahm.	Common
<i>C. ambigua</i> Schiff.	Very common
<i>C. clavigipalis</i> Scop.	Very common
<i>Rusina umbratica</i> Goeze	Common
<i>Amphipyra pyramidea</i> L.	Scarce
<i>A. tragopoginis</i> Clerck	Common
<i>Cosmia affinis</i> L.	One in 1955
<i>C. trapezina</i> L.	Common
<i>Cerastis rubricosa</i> Schiff.	Common
<i>Orthosia gothica</i> L.	Common
<i>O. cruda</i> Schiff.	Common
<i>O. stabilis</i> Schiff.	Very common
<i>O. incerta</i> Hufn.	Common
<i>O. gracilis</i> Schiff.	Fairly Common
<i>Omphaloscelis lunosa</i> Haw.	Common
<i>Parastichtis suspecta</i> Hübn.	One in 1956
<i>Agrochola lychnidis</i> Schiff.	Very common
<i>Conistra vaccinii</i> L.	Fairly common
<i>Cucullia umbratica</i> L.	Common
<i>C. absinthii</i> L.	Scarce
<i>Pyrrhia umbra</i> Hufn.	Fairly common
<i>Heliothis peltigera</i> Schiff.	One in 1958
<i>Lithacodia fasciana</i> L.	Scarce
<i>Rivula sericealis</i> Scop.	Common
<i>Scoliopteryx libatrix</i> L.	Scarce
<i>Polychrysis moneta</i> F.	Fairly common
<i>Plusia chrysitis</i> L.	Common
<i>P. festucae</i> L.	Fairly common
<i>P. gamma</i> L.	Abundant
<i>Unca tripartita</i> Hufn.	Common
<i>Mormo maura</i> L.	Rare
<i>Catocala nupta</i> L.	Fairly common

<i>Laspeyria flexula</i> Schiff.	Fairly common
<i>Zanclognatha tarsipennalis</i> Treit.	Fairly common
<i>Z. grisealis</i> Schiff.	Fairly common
<i>Hypena proboscidalis</i> L.	Common

GEOMETRIDAE

<i>Alsophila aescularia</i> Schiff.	Fairly common
<i>Pseudoterpna pruinata</i> Hufn.	Rare
<i>Hemithea aestivaria</i> Hübn.	Common
<i>Sterrhia seriata</i> Schrank	Very common
<i>S. fuscovenosa</i> Goeze	Common
<i>S. subsericata</i> Haw.	Rare
<i>S. aversata</i> L.	Very common
<i>S. subsericeata</i> Haw.	Common
<i>Scopula marginepunctata</i> Goeze	Common
<i>Calothyssanis amata</i> L.	Common
<i>Cosymbia punctaria</i> L.	Scarce
<i>Lygris testata</i> L.	Scarce
<i>L. mellinata</i> F.	Common
<i>Dysstroma truncata</i> Hufn.	Common
<i>Thera variata</i> Schiff.	Scarce
<i>T. obeliscata</i> Hübn.	Scarce
<i>Xanthorhoë ferrugata</i> Clerck.	Fairly common
<i>X. spadicearia</i> Schiff.	Common
<i>X. fluctuata</i> L.	Very common
<i>Ortholitha chenopodiata</i> L.	Scarce
<i>Operophtera brumata</i> L.	Fairly common
<i>Pelurga comitata</i> L.	Scarce
<i>Epirrhoë galiata</i> Schiff.	Rare
<i>E. rivata</i> Hübn.	Rare
<i>E. alternata</i> Müll.	Common
<i>Euphyia bilineata</i> L.	Fairly common
<i>Lyncometra ocellata</i> L.	Fairly common
<i>Plemyria rubiginata</i> Schiff.	Common
<i>Perizoma affinitata</i> Steph.	Scarce
<i>Hydriomena furcata</i> Thunb.	Common
<i>Nycterosea obstipata</i> F.	Several in 1955 and 1956
<i>Horisme tersata</i> Schiff.	Scarce
<i>Eupithecia centaureata</i> Schiff.	Very common
<i>S. pulchellata</i> Steph.	Scarce
<i>E. linariata</i> Schiff.	Scarce
<i>E. absinthiata</i> Clerck	Common
<i>E. vulgata</i> Haw.	Common
<i>E. intricata arceuthata</i> Frr.	Fairly common
<i>E. succenturiata</i> L.	Rare
<i>E. icterata</i> Vill.	Scarce
<i>E. haworthiata</i> Doubl.	Fairly common
<i>E. tenuiata</i> Hübn.	Scarce
<i>E. nanata</i> Hübn.	Rare
<i>E. subnotata</i> Hübn.	Scarce
<i>E. millefoliata</i> Rossl.	Scarce
<i>Gymnoscelis pumilata</i> Hübn.	Common
<i>Chloroclystis rectangulata</i> L.	Common
<i>Abraxas grossulariata</i> L.	Very common
<i>Aspitates ochrearia</i> Rossi	Common
<i>Bapta temerata</i> Schiff.	Scarce
<i>Itame wauaria</i> L.	Scarce
<i>Cabera pusaria</i> L.	Common
<i>Campaea margaritata</i> L.	Scarce

<i>Ennomos autumnaria</i> Wernb.	Fairly common
<i>Deuteronomos alniaria</i> L.	Fairly common
<i>D. fuscantaria</i> Steph.	Fairly common
<i>Selenia bilunaria</i> Esp.	Fairly common
<i>Crocallis elinguaris</i> L.	Common
<i>Opisthograptis luteolata</i> L.	Very common
<i>Lithina chlorosata</i> Scop.	Scarce
<i>Ouvapteryx sambucaria</i> L.	Very common
<i>Lycia hirtaria</i> Clerck	Rare
<i>Biston strataria</i> Hufn.	Fairly common
<i>B. betularia</i> L.	Fairly common
<i>Menophra abruptaria</i> Thunb.	Common
<i>Cleora rhomboidaria</i> Schiff.	Common
<i>Alcis repandata</i> L.	Scarce

COSSIDAE

<i>Zeuzera pyrina</i> L.	Common
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HEPIALIDAE

<i>Hepialus sylvina</i> L.	Rare
<i>H. humuli</i> L.	Rare

CREAM VARIETY OF THE COMMA BUTTERFLY
POLYGONIA C-ALBUM (L.). LEP., NYMPHALIDAE

During the week-end 18th/19th July, 1959, a number of Commas appeared on some uncultivated land adjoining my garden in Oxted. Most, if not all of them were of the variety *hutchinsoni*.

On the following Sunday, the 26th July, the Commas were again in the same places and, the afternoon being very hot, one of them continually endeavoured to settle on my forehead, presumably attracted by the copious beads of perspiration! At about four o'clock that afternoon I saw and captured one specimen with the whole area, which would normally be light red-brown, of a completely cream shade and with no trace of red-brown at all. The black markings and general shape of the wings being normal.

Unfortunately the butterfly has one small tear in the right forewing, but otherwise it is in perfect condition and gives the appearance of being recently emerged.

Frohawk's *Varieties of British Butterflies* mentions and illustrates an aberration in which the ground colour appears to be pure white, and also mentions, but does not illustrate, another aberration with the ground colour cream. These forms appear to be very rare and I think the present specimen is worth being placed on record.

C. E. COULSON.

West Lunchwood,
 Rockfield Road,
 Oxted, Surrey.

OBSERVATIONS ON THE BRITISH
AGROMYZIDAE—V

By KENNETH A. SPENCER

I. PHYTAGROMYZA HENDEL

(a) A SPECIES NEW TO SCIENCE

***Phytagromyza nigrivenis* sp. n.**

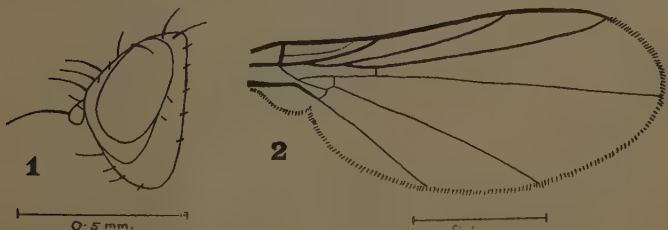
Head (Fig. 1): Frons slightly more than twice width of eye, eye particularly narrow when viewed from above. Orbits broad, well-differentiated, increasingly projecting above eye towards base of antennae. Two equal ors, the upper directed outwards, the lower inwards and upwards; three equal ori all directed inwards. Orbital setulae minute, sparse, reclinate. Ocellar triangle short, rounded at apex, scarcely extending beyond upper ors, slightly sunk in hollow of frons. Lunule small, semi-circular, raised. Cheeks broad below eye, almost half height of jowls; jowls deep, elongated at rear, in ratio 15:35 to vertical height of eye. Vibrissa somewhat shorter than lower ors, peristomal hairs slight. Antennae small, third segment round. Face small, largely covered by antennae. High epistoma present.

Mesonotum: 4 + 2 dc; first and second equal, twice length of remainder; acr irregular in 2-3 rows, extending to second dc.

Legs: Mid-tibiae without postero-dorsal bristles.

Wing (Fig. 2): Length in male 1.85 mm. Costa extending to slightly beyond vein r 5, second cross-vein lacking. Apex at vein m 1 + 2.

Colour: Frons and orbits blackish, with slight yellow undertone, more yellow anteriorly. Upper orbits to base of exterior vertical bristle shining black; from this bristle hind-margin of head narrowly yellow. Jowls, face, antennae, palps entirely yellow. Mesonotum and scutellum black, largely shining. Mesopleura predominantly yellow, with faint black traces at lower and hind-margins. Notopleural area



Figs. 1, 2. *Phytagromyza nigrivenis* sp. n. 1, Head. 2, Wing.

mainly black, with yellow undertone. Sternopleura and hypopleura black, upper margins yellow. Pteropleura blackish, irregularly yellow above. Legs: fore- and mid-coxae yellow, hind-coxae more blackish. Femora predominantly yellow, becoming blackish towards knees. Tibiae and tarsi dark, blackish. Abdomen dull-blackish in male, epanthrium somewhat lighter, yellowish. Wings somewhat darkened, veins conspicuously black. Halteres yellow, squamae whitish-grey, margins and fringe blackish.

Holotype ♂, Axmouth, Devon, swept from vegetation beside stream, 20.vi.58; one paratype ♂, same data, both in author's collection.

The species runs to couplet 15 in Hendel's (1936) key, which should be extended as follows to incorporate this and other species (as agreed with Hering):

- | | | |
|-----|---|-----------------------------------|
| 15 | tp vorhanden | <i>heringi</i> Hend. |
| — | tp fehlt | 15a |
| 15a | Schildchen ganz dunkel | 15b |
| — | Schildchen gelb | 15h |
| 15b | Taster schwarz oder braun | 15f |
| — | Taster gelb | 15c |
| 15c | Schenkel vorwiegend gelb mit schwarzen Knien. Mesonotum glänzend schwarz. Mesopleura vorwiegend gelb | |
| | <i>nigrivenis</i> Spencer | |
| — | Schenkel vorwiegend schwarz mit gelben Knien. Mesonotum matt, grau bestäubt. Mesopleura schwarz, oben schmal gelb gerandet | 15d |
| 15d | Acr 2-reihig | <i>gotlandica</i> Rydén |
| — | Acr 4-reihig | 15e |
| 15e | 1 ors, 4 ori. Vti auf schwarzem Grunde, obere Orbiten schwarz | <i>jaceicaulis</i> Hg. (in litt.) |
| — | 2 ors, 2 ori. Vti auf gelbem Grunde, Orbiten gelb ... | <i>langei</i> Hg. |
| 15f | acr in 5-6 Reihen | 15g |
| — | acr in 4 Reihen | <i>anderi</i> Rydén |
| 15g | 5-6 nach vorn kleiner werdende dc. 2. Fühlerglied gelb. Mesopleura oben nur schmal gelb | <i>dorsalis</i> Hend. |
| — | 3+1 dc. 2. Fühlerglied schwarz. Mesopleura hinten im oberen Drittel gelb | <i>albicipitoides</i> Hg. |
| 15h | ta unter oder distal der r_1 -Mündung | 15i |
| — | ta weit wurzelwärts der r_1 -Mündung (hier ausgenommen <i>hamata</i> Hd. in Punkt 171) | 15k |
| 15i | Mesonotum gelb, mit schwarzen Längslinien, acr 2-reihig. Backen $\frac{1}{2}$ Auge hoch. Epistom vorhanden | 15j |
| — | Mesonotum schwarz, nur vor den Schildchenecken gelbe Flecke. Backen niedriger. Epistom fehlt. ... | <i>dianthicola</i> Venturi |
| 15j | 3-4 ori. Orbitenhärchen fehlen. Rüssellabellen hakig verlängert. 3. Fühlerglied länger als breit. 2. Costalabschnitt des Flügels kaum 2mal so lang wie der 3. (cf.17) ... | <i>hamata</i> Hd. |

- 2 ori. Orbitenhärchen vorhanden. Rüssel kurz, stempel-
förmig. 3. Fühlerglied gerundet-quadratisch. Der 2. Costal-
abschnitt 4mal so lang wie der 3. *mamonowi* Hg.
15k 5-7 dc. acr 4reihig *falléni* Rydén
— 3 + 1 dc 16

(b) A NEW SYNONYMY

Phytagromyza incognita Hering, 1956.

Phytagromyza simplonensis Spencer, 1957a, SYN. NOV.

The description of *Phytagromyza incognita* Hg. was published at the end of 1956 and did not immediately come to my notice. My own manuscript with the description of *P. simplonensis* was submitted on 6th January, 1957, and was published in March, 1957. Only subsequently did Prof. Hering and I compare the two specimens concerned and despite very minor differences, it is clear that the two represent the same species. I therefore synonymize *simplonensis* with *incognita* herewith.

I obtained a further specimen of this species from mixed vegetation beside a stream at Axmouth, Devon, on 17.vi.1958.

(c) KEY TO BRITISH PHYTAGROMYZA SPECIES

- | | | |
|----|---|-------------------------------|
| 1 | Apex of wing lies midway between veins r5 and ml + 2 | 2 |
| — | Apex of wing at vein ml + 2 | 12 |
| 2 | Orbital setulae between orbital bristles and eye margin lacking | 3 |
| — | Orbital setulae present | 6 |
| 3 | Scutellum at least centrally yellow | 4 |
| — | Scutellum black | 5 |
| 4 | Third antennal segment and palps yellow | <i>tristriata</i> Hd. |
| — | Third antennal segment and palps black | <i>anteposita</i> (Strobl) |
| 5 | 3 + 1 dc. Jowls angular | <i>discrepans</i> (v.d. Wulp) |
| — | 2 + 0 dc. Jowls characteristically rounded | <i>orphana</i> Hd. |
| 6 | Mesonotum with only 3 dc | 7 |
| — | Mesonotum with row of 5-7 dc | 11 |
| 7 | Scutellum at least centrally yellow | <i>buhri</i> de Meij |
| — | Scutellum black | 8 |
| 8 | Second cross-vein lacking. Frons reddish | <i>incognita</i> Hg. |
| — | Second cross-vein present. Frons blackish-brown | 9 |
| 9 | At most fore-femora with yellow knees | 10 |
| — | All femora with yellow knees | <i>flavocingulata</i> (Str.) |
| 10 | Squamal fringe whitish | <i>spinicauda</i> Hg. |
| — | Squamal fringe black | <i>loniceræ</i> (R.-D.) |
| 11 | All knees distinctly yellow. Fourth and fifth dc strong, at least twice length of acr | <i>similis</i> (Bri.) |
| — | Only fore-knees yellow. Fourth and fifth dc small, scarcely longer than acr | <i>hendeliana</i> Hg. |
| 12 | Second cross-vein present | <i>heringi</i> Hd. |
| — | Second cross-vein lacking | 13 |

13	4 + 2 dc	14
—	3 + 1 dc	15
14	Femora predominantly yellow, blackish towards knees	
 <i>nigrivenis</i> Spencer	
—	Femora black with yellow knees	<i>langei</i> Hg.
15	Mesonotum with 3 rusty-reddish longitudinal bands	
 <i>populicola</i> (Hal.)	
—	Mesonotum black or with 3 black bands	16
16	Lunule semi-circular	17
—	Lunule distinctly higher than semi-circle	18
17	Mesonotum with 3 distinct black bands, central area before scutellum yellow	<i>tridentata</i> (Lw.)
—	Mesonotum black to margin of scutellum	<i>tremulae</i> Hg.
18	Hind-margin of head yellow	<i>populi</i> (Kalt.)
—	Hind-margin of head black, darker species	<i>populivora</i> Hd.

II. ADDITIONS TO BRITISH LIST

1. *Agromyza bicophaga* Hering

Leaf-mines with larvae were found on *Vicia cracca* L. at Betchworth, Surrey, on 4.vii.1958. Hendel (1936) synonymized the species with *A. orobi* Hend., but Hering (1957b) has resurrected it. *A. bicophaga* feeds exclusively on *Vicia* spp., while *A. orobi* feeds on *Lathyrus vernus* L., and the larvae of the two species are quite distinct.

The British *Agromyza* species known to feed on Papilionaceae can be identified by the following key:

- 1 Squamal fringe brown to black 2
- Squamal fringe pale, whitish or ochreous 6
- 2 Costa extends to vein r4+5 *vicifoliae* Hg.
- Costa extends to vein ml+2 3
- 3 Mid-tibia with 2 postero-dorsal bristles *lathyri* Hend.
- Mid-tibia without postero-dorsal bristles 4
- 4 Orbits entirely black *felleri* Hg.
- Orbits black only in upper half 5
- 5 Legs entirely dark. Last segment of vein m4 equal to penultimate *johannae* de Meij.
- Tibiae and tarsi pale brown. Last segment of m4 shorter than penultimate *demeijeri* Hend.
- 6 Costa extends to r4+5 7
- Costa extends to ml+2 9
- 7 Mesonotum shining black *frontella* Rond.
- Mesonotum matt grey 8
- 8 Frons twice width of eye *nana* Mg.
- Frons 1½ times width of eye *genistae* Hend.
- 9 Third antennal segment black *johannae* de Meij.
- Third antennal segment reddish 10
- 10 Veins and wing base pale yellowish-brown. Large species,

- wing length 2.8-3.1 mm. *watersi* Spencer
 — Veins uniformly dark. Small species, wing length at most
 2.5 mm. *bicophaga* Hg.

The colour of the squamal fringe in *A. johannae* is frequently intermediate between ochreous and brown and the species has therefore been included in both sections of couplet 1.

2. *Melanagromyza eupatorii* Spencer, 1957b.

I found a puparium of this species in a stem of *Eupatorium cannabinum* L. at Chippenham Fen, Cambs. on 20.ix.58. The characteristic posterior spiracles are identical to those of the type described from Germany.

I have just been informed by Prof. Hering that he has also bred this species from a puparium obtained in a stem of *Inula conyzae* DC.

3. *Phytagromyza buhri* de Meijere, 1939.

The larvae of this species form a shallow, whitish stem mine on *Galium mollugo* L. I first found these mines on the Lizard, Cornwall, in July, 1957, and have since discovered them at Betchworth, Surrey; Newmarket, Suffolk; and Wrotham, Kent. The species thus appears to be widespread with its food-plant.

The fly itself has not yet been recorded in this country.

4. *Liriomyza striata* Hendel.

I recently discovered a single specimen of this species among undetermined material of the late Mr. H. Britten kindly sent me for examination by Dr. W. D. Hincks. The specimen was caught on 26.vi.26 in Staffordshire.

The species is uncommon and has previously only been recorded from Austria and the Leningrad area of Russia. It most closely resembles *L. fasciata* Hend.; Spencer (1958) briefly discussed the difference between the two species.

5. *Napomyza hirticornis* Hendel.

I swept a single specimen of this species at Scratch Wood, Middlesex, on 17.viii.1958. The species closely resembles the common *N. lateralis* Fall., but it is immediately recognizable by the long, upcurved hairs on the third antennal segment. It is not a common species but occurs widely in Europe.

6. *Phytomyza isais* Hering, 1936.

Phytomyza odontitae Hering, 1949.

Mr. S. Wakely obtained large numbers of puparia of this species from seeds of *Odontites verna* (Bell.) Dum. (= *Bartsia odontites* (L.) Huds.) at Chipstead, Surrey, in September, 1957. From these I bred out the flies in June, 1958. Griffiths (1956) gives an extension to Hendel's (1936) key, which includes this species.

The species is local but occurs widely with the food-plant.

7. *Phytomyza origani* Hg., 1931.

Hendel (1936) synonymized this species with *obscura* Hd., although the mines of the two species show characteristic differences. Nowakowski (1959) has confirmed from studies of genitalia that these

two species and other leaf-miners on Labiatae are definitely distinct.

I first obtained specimens of *P. origani* from leaf-mines on *Origanum vulgare* L. at Cheddar, Som., on 1.vii.1958. I have also obtained the species from Box Hill, Surrey, and Otford, Kent. The larva forms a linear mine at the apex of the leaf, and as the channel winds backwards and forwards a conspicuous, blackish secondary blotch is formed. Pupation is normally in the leaf. The species occurs widely with its food-plant.

8. *Phytomyza orobanchia* Kalt.

The characteristic brown puparia of this species were found both in the seeds and in the root at the level of the ground on *Orobanche minor* Sm., near Tring, Herts., on 10.viii.58.

The species occurs on various *Orobanche* spp. and is widespread with the food-plant throughout Europe.

9. *Phytomyza silaicomis* Hering (in litt.).

A single specimen bred by Prof. Hering from leaf-mine on *Silaum silaus* (L.) Schinz & Thell, Scratch Wood, Middlesex, on 4.vii.1958. The species is uniformly black and is thus immediately distinguishable from *P. silai* Hg., which has a bright yellow frons.

III. SPECIES NOW CONFIRMED IN BRITAIN

1. *Agromyza frontella* Rond.

I swept a single specimen of this species on *Vicia lutea* L. at Otford, Kent, on 2.viii.57. It had hitherto been known in this country only from its leaf-mine (Parmenter, 1954a).

2. *Agromyza lathyri* Hendel.

This species has previously been confused with *A. watersi* Spencer, 1957c (Spencer, 1957d), although empty leaf-mines were reported by Parmenter (1954a). In July, 1958, numerous leaf-mines of this species were discovered at Beckenham, Kent, on *Pisum sativum* L., a favourite food-plant, and a number of puparia were obtained. On the posterior spiracles there are up to 40 minute buds, which immediately distinguishes the species from *A. watersi*, where the posterior spiracles have three buds only.

Re-examination of unemerged puparia from Kew Gardens shows that *A. watersi* occurs there on *Lathyrus latifolius* L., but *A. lathyri* on *L. grandiflorus* L. and *L. tuberosus* L.

3. *Liriomyza cicerina* (Rondani).

I swept a number of specimens of this species on *Ononis repens* L. at Wrotham, Kent, on 19.vii.1958. The leaf-mines have also been observed in the Box Hill area, Surrey.

The species is probably widespread with its food-plant and is readily recognizable by the darkened third antennal segment.

4. *Liriomyza pisivora* Hering, 1957a.

Parmenter (1954b) referred to this species, at that time undescribed and unnamed, which Hering had identified both from imagines from Hendon, Middlesex, and leaf-mines from Chipstead, Surrey.

On 19th July, 1958, I obtained leaf-mines of this species on garden peas at Beckenham, Kent, and the larvae pupated on 24th July.

It seems probable that the species occurs widely in this country and has hitherto been overlooked.

5. *Phytomyza fuscula* Zett.

There has been some doubt about the validity of British records of this species (Spencer, 1954b). Through the kindness of Dr. T. R. E. Southwood I have now had the opportunity to examine specimens bred from leaf-mines on wheat at Hurley, Berks. The species has a yellow frons and is distinctly larger than *P. nigra* Mg., with which it has in the past been confused, and the shining black puparium cannot be mistaken.

IV. BIOLOGICAL NOTE

Liriomyza lutea (Mg.).

In the summer of 1956 I obtained large numbers of this species at various localities on flower-heads of Umbelliferae as follows:

5th August: Kandersteg, Switzerland on *Heracleum sphondylium*

L. and possibly *Laserpitium latifolium* L.

14th August: Grasmere, Westmorland on *Angelica sylvestris* L.

16th August: Cefn-y-bedd, nr. Wrexham, Denbigh, on *Heracleum*.

17th August: Llangollen, Denbigh., on *Heracleum*.

These discoveries suggested strongly that the species might feed on the fruits of these Umbelliferae.

On 17th July, 1958, in the company of Prof. E. M. Hering I discovered the fly to be common on flower-heads of *Pastinaca sativa* L. at Wrotham, Kent, and I again found the fly on *Pastinaca* at Otford, Kent, on 2nd August during a Field Meeting of the South London Entomological and Natural History Society. On the latter occasion I selected a random sample of 20 *Pastinaca* flower-heads and after a week, on opening up individual seeds, discovered a number of full-grown Agromyzid larvae. A number of these pupated and others were sent to Prof. Hering for detailed examination and will be described in due course in the Tijds. v. Ent. Amsterdam. Unfortunately no flies have been bred, but it is clearly established that the larvae are of *L. lutea* (Mg.).

On 9th August, 1958, I was able to observe flies of this species making feeding punctures in the young seeds of *Heracleum sphondylium* L., near Tring, Herts. The fly rested above the seed among the petals and the ovipositor was inserted deeply into the stylopodium. In the usual way the fly then walked backwards over the puncture until it was able to imbibe the exuding liquid. Unfortunately no eggs were found, but it seems likely that oviposition takes place in the same manner. Larvae were subsequently obtained from these *Heracleum* flower-heads.

My previous record (Spencer, 1954a) of this species having been bred from *Asplenium ruta-muraria* L. must now be regarded as

erroneous. In July, 1957, I examined the leaf-mines occurring on *Asplenium* at Cheddar, Somerset, from which it had been reported that *L. lutea* (Mg.) had been bred but found the mines to be of *Phytomyza scolopendrii* R.-D., which occur commonly on this and other ferns. *P. scolopendrii* is one of the small group of *Phytomyza* spp. with a yellow scutellum, and it is suggested that this may somehow have led to the error.

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BOOK REVIEW

Key to the Names of British Butterflies and Moths, by R. D. Macleod, London, 1959. 8vo. pp. vii; 86. Cloth. Published by Pitman at 15s.

The introduction to the Key outlines briefly the origin of scientific names in zoology, explains the methods of their formation, their pronunciation and the reasons for their use.

There follows then a list of the scientific names of the British Lepidoptera, together with explanations of their derivation and meaning; the list is divided into three sections—butterflies, macro-moths and micro-moths. With this absorbing and instructive section of his book, Mr. Macleod will surely stimulate many of his readers to learn the international scientific names and to use them with the same familiarity that they now use the often attractive, though insular, common names of the butterflies and macros.

His enthusiasm to find explanations for the scientific names has upon occasion led the author astray. For example, *Orgyia antiqua* was not so named to distinguish it from *recens*, for Hübner's *recens* was not published until some sixty years after Linné's *antiqua*. Similarly Hübner could not have considered his *Eupithecia sobrinata* to be a cousin of *anglicata*, for Hübner's name antedates *anglicata* by nearly fifty years. The dates of publication of F. N. Pierce's works on the genitalia of British Moths (see under *Acedes piercella*) should also be corrected in future editions to read '1909-1942'.

In view of the changes that have to be made from time to time in the nomenclature, a point noted by the author himself in the introduction, an index of specific names showing the genus in which the author included them would greatly have enhanced the value of the book as a work of reference.

The third part of the Key lists a selection of the common names of British Lepidoptera with explanations of their derivation and meaning; this list is also divided into three sections. Two matters of fact in the macro lists need correction: 'later it becomes yellowish' should be deleted from the explanation of the 'White-Bordered' var. of the Camberwell beauty, for the statement is not true; the Scarbank Gem was first discovered in Dorsetshire not Dumfries-shire. The inclusion of the common names of the micros is of value inasmuch as a glance at such abominations as Rolling Carrot Flat-body will surely persuade the veriest beginner to learn rather the scientific names of this group.

The book will be a valuable addition to the library of every lepidopterist and an especially useful addition to both school and public libraries.

D. S. FLETCHER.

ANCISTROCERUS PARIETINUS (L.) (HYM., VESPIDAE)
AN UNUSUAL NESTING SITE

In the autumn of 1957 my colleague, Mr. R. W. Genever, gave me a small bayonet-type electric light plug, the opening of which was sealed over with a hard cement-like material. He mentioned that in the summer he had observed a single solitary wasp in his caravan carrying a number of parasitized caterpillars to the electric light plug, which was not in use at the time.

After filling the plug with caterpillars the solitary wasp carefully sealed the opening. Other positions chosen for the construction of cells included crevices between a cushion and the panelling of the caravan, also the gap between a small domestic pipe and the ceiling.

On the 8th July of this year seven adult male solitary wasps successfully emerged and were kindly identified by Dr. I. H. H. Yarrow of the Department of Entomology, British Museum of Natural History as *Ancistrocerus parietinus* L. (Vespidae), which belongs to the group of solitary mason wasps.

I am very grateful to Mr. R. Worsley for the photograph of the adult wasp and electric light plug.

PANCHLORA SPECIES (ORTHOPTERA: BLATTIDAE)

On the 6th August, 1958, a local forest worker brought into the laboratory a female Cockroach which he had caught in Alice Holt Forest, Hampshire, while working in the plantations.

The Cockroach, which was identified as a *Panchlora* species, measured 26 mm. in length, with a wing span of 42 mm. When closed the delicate wings extended 6 mm. beyond the tip of the abdomen. The thorax and the abdomen are pale yellow green in colour with a bright yellow margin, which also extends along the leading edge of the forewings. On the dorsal surface of the head there is a reddish-brown stripe, and the antennae are pale brown. The pale green thoracic legs have a prominent arolium between the tarsal claws.

The members of this genus are frequently reported as being introduced into Great Britain in consignments of fruit from the West Indies. (1956. Hincks, W. D., Handbooks for the Identification of British Insects, Vol. 1, Part 5, p. 12.)

The Cockroach was kept in the laboratory, and on the 1st September an egg purse was laid containing forty eggs in a double row, placed one above the other. Unfortunately, these were infertile. The opaque eggs measure 0.5 mm. x 3 mm. The adult remained alive until the 4th September.

I am very grateful to Dr. D. Ragge of the British Museum (Natural History) for confirmation of the identification, also to the Forestry Commission for the photograph of the adult.

Forest Research Station,

J. H. STYLES.

Alice Holt Lodge, Near Farnham, Surrey.

20th October, 1958.



Panchlora sp. ♀ Blattidae.
Photo by Forestry Commission.



Ancistrocerus parietinus (L.) (Vespidae).
Photo by R. Worsley.

ISCHNURA PUMILIO VAR. *AURANTIACA* SELYS IN BRECONSHIRE (ODONATA, COENAGRIIDAE)

By DAVID KYLE, M.A., M.B., B.C.H.

Ischnura pumilio (Charp.) is one of the smallest and rarest of the Odonata indigenous to the British Isles, and its feeble flight precludes any possibility of its numbers being increased by migration. From the literature at my disposal it does not appear to have been common at any time since records were kept.

According to Miss Longfield in *The Dragonflies of the British Isles* (second edition 1949) 'The Scarce *Ischnura* is only known in three counties in England and possibly four in Ireland. In Hampshire it is abundant still in one area.* It was once more plentiful, showing that without the very greatest care it may end by becoming extinct'. W. J. Lucas, in *British Dragonflies* (1900), says: 'As a British insect, this species seems to be lost at the present time, for no locality can be given where it now can be found. But being so small, it may be easily passed over, considering also that Neuropterists are so few that but little of the surface of the British Isles may have been covered by them.' He also quotes from the great Charpentier, who writes in *Horae Entomologicae* (1825) that he has been able to examine so few specimens that the description may later have to be altered. In Charpentier's own words, 'Pauca tantummodo hujus Agrii specimina examini subjicere potui, ideoque fortasse descriptio posthac erit emendanda'.

My own personal addiction to dragonflies developed in the spring of 1957, and there are many species that I have not seen on the wing. On 15th June, 1958, I noticed some small bright orange damselflies fluttering among the reeds on a small moorland pond a few miles from Brecon. Two were captured, and though a superficial examination was enough to show that they were unlike anything I had seen before, it was with a feeling of curiosity rather than excitement that I put them in a test tube of surgical spirit to await a more detailed examination.

Some months later I made a serious attempt to identify them, and tried in vain to fit them in with any of the described varieties of *Ischnura elegans* or of the other small damselflies. Finally, by a process of exclusion it seemed that the only answer was *Ischnura pumilio* var. *aurantiaca* in spite of the fact that as far as I knew it had never been recorded in Wales.

With no real faith in my diagnosis, I sent the two specimens off to Miss Longfield for a specialist opinion, and I quote from her reply: 'You have got *Ischnura pumilio* var. *aurantiaca*. The two females were so enormous—in fact exactly the same size as *elegans*, that at first I did not believe it. So I had to take them out of the bottle and very carefully examine them all over. The female of the species are always

so like each other, but do what I could I could not make them into *elegans*—you will be pleased to hear. They should not have been so big, and I shall love to hear next year if the males run to such large proportions. Keep your little pool very secret, as *pumilio* is easily wiped out and not yet very hardy in the British Isles. In 1952 it was found breeding in the Gower Peninsula, so not so peculiar that you have it in Brecon. However, it is a very nice find.'

It gave me great pleasure to have the identity thus confirmed, though the pleasure was perhaps at the same time a little dimmed by the fact that it was not as I had hoped a new record for Wales. As Miss Longfield advised, I have kept the exact site of the pool a secret, and now look forward to the coming summer and the prospect of taking one or two males as well.

* Unfortunately this does not seem to be so, as of recent years it has disappeared from one or more of its long-known habitats.—A.E.G.

BOOK REVIEW

Outlines of Entomology by A. D. Imms, extensively revised by Professor O. W. Richards and R. G. Davies. Methuen, London. 224 pages, 94 text figures. 1959. Price 21s.

This is the fifth edition of this well-known and extremely useful book which has now been extensively revised and completely reset in a modern style. It is in fact the first major revision of this work, and brings it right into line with modern entomological knowledge.

While the General Textbook of Entomology is perhaps a little too expensive for the amateur entomologist and probably contains more than is usually required, the present work is reasonable in price and covers the field as fully as a great many amateurs will ever require. The chapter on anatomy and physiology comprises very nearly half the book and deals with this aspect of entomology very thoroughly indeed. Development and Metamorphosis, Some important modes of Life in Insects, Nomenclature and Classification, and Relationship of Insects, each occupy a chapter; and there is also an appendix on literature.

In the chapter on Nomenclature and Classification each Order receives some attention, the more important Orders receiving relatively more space than the minor Orders.

The figures are good and very clear indeed, the List of Contents is broken down not only into chapters but also into sections which makes reference simplicity itself, while a comprehensive index takes care of the detailed references.

Not only is this book technically sound, but is a model of book production of which both the publisher and authors can be justifiably proud. Any entomologist without a copy of the General Textbook of Entomology cannot afford to be without this work.

F.D.B.

REVISED INDEXED CHECK-LIST OF THE BRITISH LEPIDOPTERA

By I. R. P. HESLOP, M.A.

PART I

Introductory Note to Part I (Papilionoidea-Geometroidea)

Unlike its predecessors, this Third Edition of my Check-list is being published in Parts. Introductory Notes to the various Parts will therefore have to serve instead of a comprehensive Introduction: nor will it be possible to furnish a definitive title to the whole work until it is concluded and the sum of species is known. I have delved deeply into the literature for records of the authentic occurrence of species; but fresh instances are arising constantly.

As before, Indices to the whole will be provided.

Unlike its predecessors, also, this Edition must serve the dual purpose of a Label List. Some considerable alteration in the format is therefore required. It is, for example, necessary to repeat the generic name for each species. In order, however, to catch the eye (and also to give a general impression of the frequency of incidence of the genera), the opening species of each genus is marked with an asterisk.

Apart from such changes of appearance, great care has been taken to maintain continuity with the previous Editions. As before, a few insects nowadays usually treated as sub-species are here (some half-dozen in this Part) included as species, having acquired a place in the literature as such. In my opinion most of such are more worthy of specific rank than some of the more subtle of the differentiations recently made. As before, it has not been found possible to include sub-species per se: but it is hoped to issue a separate list of all those among the Macrolepidoptera.

The present Part covers all the super-families of the so-called Macrolepidoptera; and none other. In its compilation I have strictly bound myself by official requirements of generic and specific nomenclature. In fact, this publication owes more to the generous help of the specialists in the various groups than did either of the previous Editions. Tribute and acknowledgment have been already paid in an Editorial comment of the *Entomologist's Gazette* (Vol. 9, p. 164) to some of these gentlemen. But in addition to these named—to whom I most heartily renew my obligation—I would like to mention here, in the same terms, Mr. N. D. Riley, Mr. S. Wakely and the Baron de Worms.

In the case of the sub-families I have, as previously, allowed myself some little latitude in giving prominence to this feature, in partial compensation for the progressive deterioration of the genus as an instrument of classification. The general arrangement also remains my own: as developed from the Second Edition it is not significantly divergent from other systems of classification in general use.

Even before the decision was made to publish the present Edition in Parts, the former Super-family Micropterygoidea ('Micropteryges') had been split; and also the Super-family Psychoidea had been moved into a position next to the Bombycoidea. But it is purely as a matter of convenience that the new Super-family Hepialoidea has now been moved into a position among the other Super-families of the 'Macrolepidoptera'.

The family Hylophilidae has been moved from the Super-family Bombycoidea to the Super-family Noctuoidea (Agrotoidea). The family Syntomidae has been moved from the Super-family Psychoidea to the Super-family Bombycoidea.

It will be observed that the Super-family terminations have been brought into line with current practice.

The disappearance of a synonym, previously shown, does not necessarily mean that the name is no longer applicable. The construction of this work has never permitted of the quotation of more than one synonym for a species.

In consequence of a decision of the International Commission, suppressing Goeze as a nomenclator, pains have been taken to eliminate all Goeze names in this Part and to find and supply substitutes therefor.

In a few instances in this Part there have been restorations and slight corrections of English names (as before, featured throughout the work); but in no case has there been such change in both the scientific and the English Nomenclature of a species as to obscure its identity vis-à-vis the previous Edition.

The species have been re-numbered consecutively in this Part, and this process will be continued throughout. But, for the reason just stated, the provision of a table of equivalents is not considered necessary.

It is intended that the next Part, which is already in an advanced stage of preparation, should comprise the Pyraloidea and the Tortricoidea.

This Introductory Note is dated as on the day when the last check was made of the transcript from my Draft. The Draft itself was completed on 31st December, 1958.

'Belfield,' Burnham-on-Sea, Somerset.
26th February, 1959.

LEPIDOPTERA

Super-family PAPILIONOIDEA

PAPILIONIDAE

PAPILIONINAE

(Swallowtails)

- *1 *Papilio machaon* L.
Common Swallowtail

- 2 *Papilio podalirius* L.
Scarce Swallowtail

PARNASSIINAE

(Parnassians)

- *3 *Parnassius apollo* L.
Apollo

PIERIDAE

PIERINAE

(Whites)

- *4 *Aporia crataegi* L.
Black-veined White

- *5 *Pieris brassicae* L.
Large Garden White

- 6 *Pieris rapae* L.
Small Garden White

- 7 *Pieris napi* L.
Green-veined White

- *8 *Pontia daplidice* L.
Bath White

- *9 *Anthocharis cardamines* L.
Orange-tip White

- *10 *Leptidea sinapis* L.
Wood White

RHODOCERINAE

(Redhorns or Sulphurs)

- *11 *Colias hyale* L.
Pale Clouded Yellow

- 12 *Colias australis* Verity
(*calida* Verity)
Berger's Clouded Yellow

- 13 *Colias croceus* Fourc.
(*edusa* F.)
Common Clouded Yellow

- *14 *Gonepteryx rhamni* L.
Brimstone

DANAIDAE

DANAINAE

(Danaids or Monarchs)

- *15 *Danaus plexippus* L.
(*menippe* Hübn.)
Milkweed

SATYRIDAE

SATYRINAE

(Satyrs)

- *16 *Pararge megera* L.
Wall Brown

- 17 *Pararge aegeria* L.
Speckled Wood

- *18 *Eumenis semele* L.
Grayling

- *19 *Erebia epiphron* Knoch
Mountain Ringlet

- 20 *Erebia aethiops* Esp.
(*blandina* F.)
Northern Brown

- 21 *Erebia ligea* L.
Arran Brown

- *22 *Maniola jurtina* L.
(*janira* L.)
Meadow Brown

- 23 *Maniola tithonus* L.
Gatekeeper

- *24 *Coenonympha pamphilus* L.
Small Heath

- 25 *Coenonympha tullia* Müll.
(*tiphon* Rott.)
Large Heath

- *26 *Aphantopus hyperantus* L.
Common Ringlet

- *27 *Melanargia galathea* L.
Marbled White

NYMPHALIDAE

APATURINAE

(Emperors)

- *28 *Apatura iris* L.
Purple Emperor

LIMENITINAE

(Sibyls or Wood-admirals)

- *29 *Limenitis camilla* L.
(sibylla L.)
White Admiral

NYMPHALINAE

(Vanessids or Angle-wings)

- *30 *Vanessa atalanta* L.
Red Admiral
- 31 *Vanessa cardui* L.
Painted Lady
- 32 *Vanessa huntera* F.
Scarce Lady
- *33 *Nymphalis io* L.
Peacock
- 34 *Nymphalis antiopa* L.
Camberwell Beauty
- 35 *Nymphalis xanthomelas* Esp.
Eastern Tortoiseshell
- 36 *Nymphalis polychloros* L.
Large Tortoiseshell
- *37 *Aglais urticae* L.
Small Tortoiseshell
- *38 *Polygonia c-album* L.
Comma

ARGYNNINAE

(Fritillaries)

- *39 *Argynnis paphia* L.
Silver-washed Fritillary
- 40 *Argynnis cydippe* L.
(adippe L.)
High Brown Fritillary
- 41 *Argynnis niobe* L.
Niobe Fritillary
- 42 *Argynnis aglaia* L.
Dark Green Fritillary
- 43 *Argynnis lathonia* L.
Queen of Spain Fritillary
- *44 *Clossiana euphrosyne* L.
Large Pearl-bordered
Fritillary
- 45 *Clossiana selene* Schiff.
Small Pearl-bordered
Fritillary
- 46 *Clossiana dia* L.
Weaver's Fritillary

- *47 *Melitaea athalia* Rott.
Heath Fritillary

- 48 *Melitaea cinxia* L.
Glanville Fritillary

- *49 *Euphydryas aurinia* Rott.
(artemis Schiff.)
Marsh Fritillary

NEMEOBIIDAE

NEMEOBIINAE

(Dukes)

- *50 *Hamearis lucina* L.
Duke of Burgundy

LYCAENIDAE

THECLINAE

(Hairstreaks)

- *51 *Thecla betulae* L.
Brown Hairstreak
- 52 *Thecla quercus* L.
Purple Hairstreak
- *53 *Strymonidia pruni* L.
Black Hairstreak
- 54 *Strymonidia w-album* Knoch
White-letter Hairstreak
- *55 *Callophrys rubi* L.
Green Hairstreak

LYCAENINAE

(Coppers)

- *56 *Lycaena dispar* Haw.
Large Copper
- 57 *Lycaena hippothoe* L.
Purple-edged Copper
- 58 *Lycaena phlaeas* L.
Small Copper

POLYOMMATINAE

(Blues)

- *59 *Lampides boeticus* L.
Long-tailed Blue
- *60 *Everes argiades* Pall.
Short-tailed Blue
- *61 *Plebejus argus* L.
(aegon Schiff.)
Silver-studded Blue
- *62 *Aricia artaxerxes* F.
Scotch Brown Blue

- 63 *Aricia agestis* Schiff.
(*astrarche* Bergst.)
Brown Argus Blue
- *64 *Polyommatus icarus* Rott.
Common Blue
- *65 *Lysandra coridon* Poda
Chalk-hill Blue
- 66 *Lysandra bellargus* Rott.
(*thetis* Rott.)
Adonis Blue
- *67 *Cyaniris semiargus* Rott.
(*acis* Schiff.)
Mazarine Blue
- *68 *Celastrina argiolus* L.
Holly Blue
- *69 *Cupido minimus* Fuessl.
Small Blue
- *70 *Maculinea arion* L.
Large Blue
- HESPERIIDAE**
PYRGINAE
(*Black-and-white Skippers* or
Grey Skippers)
- * 71 *Pyrgus malvae* L.
Grizzled Skipper
- *72 *Erynnis tages* L.
Dingy Skipper
- HESPERIINAE**
(*Brown Skippers*)
- *73 *Thymelicus sylvestris* Poda
(*thaumas* Hufn.)
Common Small Skipper
- 74 *Thymelicus lineola* Ochs.
New Small Skipper
- 75 *Thymelicus acteon* Rott.
Lulworth Skipper
- *76 *Ochlodes venata* Br. & Grey
(*sylvanus* Esp.)
Large Skipper
- *77 *Hesperia comma* L.
Silver-spotted Skipper
- *78 *Carterocephalus palaemon*
Pall.
(*paniscus* F.)
Chequered Skipper

Super-family SPHINGOIDEA

SPHINGIDAE SMERINTHINAE

- *79 *Mimas tiliae* L.
Lime Hawk
- *80 *Laothoe populi* L.
Poplar Hawk
- *81 *Smerinthus ocellata* L.
Eyed Hawk

SPHINGINAE

- *82 *Acherontia atropos* L.
Death's-head Hawk
- *83 *Herse convolvuli* L.
Convolvulus Hawk
- 84 *Herse cingulata* F.
Drury's Unicorn Hawk
- *85 *Protoparce quinquemaculatus*
Haw.
Yellow-spotted Hawk

- *86 *Sphinx ligustri* L.
Privet Hawk

- *87 *Hyloicus pinastri* L.
Pine Hawk

DEILEPHILINAE

- *88 *Celerio hippophaes* Esp.
Seathorn Hawk
- 89 *Celerio nicaea* de Prunner
Mediterranean Hawk
- 90 *Celerio euphorbiae* L.
Spurge Hawk
- 91 *Celerio galii* Rott.
Bedstraw Hawk
- 92 *Celerio livornica* Esp.
(*lineata* F.)
Striped Hawk

- *93 **Hippotion celerio** L.
Silver-striped Hawk
- *94 **Daphnis nerii** L.
Oleander Hawk
- *95 **Deilephila porcellus** L.
Small Elephant Hawk
- 96 **Deilephila elpenor** L.
Large Elephant Hawk

MACROGLOSSINAE

- *97 **Macroglossum stellatarum** L.
Humming-bird Hawk
- *98 **Hemaris fuciformis** L.
Broad-bordered Bee Hawk
- 99 **Hemaris tityus** L.
(*bombylifomis* Esp.)
Narrow-bordered Bee Hawk

Super-family BOMBYCOIDEA

NOTODONTIDAE
CERURINAE

- *100 **Harpyia bicuspis** Borkh.
Alder Kitten
- 101 **Harpyia bifida** Brahm
(*hermelina* auct.)
Poplar Kitten
- 102 **Harpyia furcula** Clerck
Sallow Kitten

- *103 **Cerura vinula** L.
Puss

NOTODONTINAE

- *104 **Stauropus fagi** L.
Lobster Prominent
- *105 **Gluphisia crenata** Esp.
Dusky Marbled Brown
- *106 **Drymonia dodonaea** Schiff.
(*trimacula* Esp.)
Light Marbled Brown
- *107 **Chaonia ruficornis** Hufn.
(*chaonia* Hübn.)
Lunar Marbled Brown
- *108 **Pheosia tremula** Clerck
Greater Swallow Prominent
- 109 **Pheosia gnoma** F.
(*dictaeoides* Esp.)
Lesser Swallow Prominent
- *110 **Notodonta ziczac** L.
Pebble Prominent
- 111 **Notodonta dromedarius** L.
Iron Prominent
- 112 **Notodonta tritophus** Schiff.
(*phoebe* Sieb.)
Three-humped Prominent

- 113 **Notodonta torva** Hübn.
Large Dark Prominent

- 114 **Notodonta trepida** Esp.
(*anceps* auct.)
Great Prominent

- *115 **Leucodonta bicoloria** Schiff.
White Prominent

- *116 **Lophopteryx cucullina** Schiff.
(*cuculla* Esp.)
Maple Prominent

- 117 **Lophopteryx capucina** L.
(*camelina* L.)
Coxcomb Prominent

- *118 **Odontosia carmelita** Esp.
Scarce Prominent

- *119 **Ptilophora plumigera** Schiff.
Plumed Prominent

- *120 **Pterostoma palpina** Clerck
Pale Prominent

- *121 **Phalera bucephala** L.
Buff-tip

- *122 **Clostera curtula** L.
Large Chocolate-tip

- 123 **Clostera anachoreta** Schiff.
Scarce Chocolate-tip

- 124 **Clostera pigra** Hufn.
(*reclusa* F.)
Small Chocolate-tip

THYATIRIDAE
THYATIRINAE

- *125 **Habrosyne pyritoides** Hufn.
(*derasa* L.)
Buff Arches

- *126 **Thyatira batis** L.
Peach Blossom

- *127 *Tethea ocularis* L.
(*octogesima* Hübn.)
Figure of Eighty
- 128 *Tethea* or Schiff.
Poplar Lutestring
- 129 *Tethea duplaris* L.
Least Satin Lutestring
- 130 *Tethea fluctuosa* Hübn.
Greater Satin Lutestring
- *131 *Asphalia diluta* Schiff.
Lesser Lutestring
- *132 *Achlya flavicornis* L.
Yellow-horned Lutestring
- *133 *Polyplocia ridens* F.
Frosted Green Lutestring

LYMANTRIIDAE

LYMANTRIINAE

- *134 *Orgyia recens* Hübn.
(*gonostigma* auct.)
Scarce Vapourer
- 135 *Orgyia antiqua* L.
Common Vapourer
- *136 *Dasychira fascelina* L.
Dark Tussock
- 137 *Dasychira pudibunda* L.
Pale Tussock
- *138 *Euproctis chrysorrhoea* L.
(*phaeorrhoea* Don.)
Brown-tail
- 139 *Euproctis similis* Fuessl.
Gold-tail
- *140 *Laelia caenosa* Hübn.
Reed Tussock
- *141 *Arctornis l-nigrum* Müll.
(*v-nigrum* F.)
Black V
- *142 *Leucoma salicis* L.
White Satin
- *143 *Lymantria dispar* L.
Gipsy
- 144 *Lymantria monacha* L.
Black-arched Tussock

LASIOCAMPIDAE

LASIOCAMPINAE

- *145 *Malacosoma neustria* L.
Common Lackey

- 146 *Malacosoma castrensis* L.
Ground Lackey

- *147 *Trichiura crataegi* L.
Pale Eggar
- *148 *Poecilocampa populi* L.
December Eggar
- *149 *Eriogaster lanestris* L.
Small Eggar
- *150 *Lasiocampa quercus* L.
Oak Eggar
- 151 *Lasiocampa trifolii* Schiff.
Grass Eggar
- *152 *Macrothylacia rubi* L.
Fox

- *153 *Dendrolimus pini* L.
Pine Lappet

- *154 *Philudoria potatoria* L.
Drinker

GASTROPACHINAE

- *155 *Epicnaptera ilicifolia* L.
Small Lappet
- *156 *Gastropacha quercifolia* L.
Common Lappet

BOMBYCIDAE

BOMBYCINAE

- *157 *Endromis versicolora* L.
Kentish Glory
- *158 *Bombyx mori* L.
Mulberry Silkworm

SATURNIIDAE

SATURNIINAE

- *159 *Saturnia pavonia* L.
(*carpini* Schiff.)
Empress

DREPANIDAE

DREPANINAE

- *160 *Drepana harpagula* Esp.
(*sicula* Hübn.)
Scarce Hook-tip
- 161 *Drepana binaria* Hufn.
Oak Hook-tip
- 162 *Drepana cultraria* F.
Barred Hook-tip

163 *Drepana falcataria* L.
Pebble Hook-tip

164 *Drepana lacertinaria* L.
Scalloped Hook-tip

CILICINAE

*165 *Cilix glaucata* Scop.
Chinese Character

NOLIDAE

NOLINAE

*166 *Nola cucullatella* L.
Short-cloaked Black Arches

167 *Nola strigula* Schiff.
Small Black Arches

168 *Nola albula* Schiff.
(*albulalis* Hübn.)
Kent Black Arches

*169 *Celama confusalis* H.-S.
Least Black Arches

170 *Celama trituberculana* Bosc
(*centonalis* Hübn.)
Scarce Black Arches

ARCTIIDAE

LITHOSIINAE

*171 *Atolmis rubricollis* L.
Red-necked Footman

*172 *Nudaria mundana* L.
Muslin Footman

*173 *Comacla senex* Hübn.
Round-winged Footman

*174 *Miltochrista miniata* Forst.
Rosy Footman

*175 *Setina irrorella* L.
Dew Footman

*176 *Cybosia mesomella* L.
Four-dotted Footman

*177 *Lithosia quadra* L.
Large Footman

*178 *Eilema deplana* Esp.
(*depressa* Esp.)
Buff Footman

179 *Eilema griseola* Hübn.
(*stramineola* Doubl.)
Dingy Footman

180 *Eilema lurideola* Zinck.
Common Footman

181 *Eilema complana* L.
Scarce Footman

182 *Eilema sericea* Gregs.
Northern Footman

183 *Eilema pygmaeola* Doubl.
(*lutarella* auct.)
Pigmy Footman

184 *Eilema caniola* Hübn.
Hoary Footman

185 *Eilema sororcula* Hufn.
Orange Footman

*186 *Pelosia muscerda* Hufn.
Dotted Footman

ARCTIINAE

*187 *Coscinia striata* L.
(*grammica* L.)
Feathered Flunkey

188 *Coscinia cribraria* L.
(*cribrum* L.)
Black-speckled Flunkey

*189 *Utetheisa pulchella* L.
Crimson-speckled Flunkey

190 *Utetheisa bella* L.
Pale Speckled Flunkey

*191 *Callimorpha jacobaeae* L.
Cinnabar

*192 *Spilosoma lubricipeda* L.
(*menthastri* Esp.)
White Ermine

193 *Spilosoma urticae* Esp.
Water Ermine

194 *Spilosoma lutea* Hufn.
(*lubricipeda* auct.)
Buff Ermine

*195 *Cynia mendica* Clerck
Muslin Ermine

*196 *Diacrisia sannio* L.
(*russula* L.)
Clouded Ermine

*197 *Phragmatobia fuliginosa* L.
Ruby Tiger

*198 *Pyrrharcia isabella* Abbot &
Smith
Isabelline Tiger

*199 *Parasemia plantaginis* L.
Wood Tiger

*200 *Arctia caja* L.
Garden Tiger

201 *Arctia villica* L.
Cream-spot Tiger

HYP SINAE

*202 *Euplagia quadripunctaria*
Poda
(*hera* L.)
Jersey Tiger

*203 *Panaxia dominula* L.
Scarlet Tiger

SYNTOMIDAE

SYNTOMINAE

*204 *Syntomis phegea* L.
Nine-spotted

*205 *Euchromia lethe* F.
Basker

THYRETINAE

*206 *Naclia ancilla* L.
Handmaid

ANTICHLORINAE

*207 *Ceramidia caca* Hübn.
Docker

Super-family PSYCHOIDEA

LIMACODIDAE

HETEROGENEINAE

*208 *Apoda avellana* L.
(*limacodes* Hufn.)
Festoon

*209 *Heterogenea asella* Schiff.
Triangle

ZYGAENIDAE

CHARIDEINAE

*210 *Charidea hypparchus* Cram.
Belfield Burnet

ZYGAENINAE

*211 *Zygaena purpuralis* Brunn.
(*pilosellae* Esp.)
Transparent Burnet

212 *Zygaena exulans* Hoh.
Scotch Mountain Burnet

213 *Zygaena loti* Schiff.
(*achilleae* Esp.)
Slender Scotch Burnet

214 *Zygaena viciae* Schiff.
(*meliloti* Esp.)
New Forest Burnet

215 *Zygaena trifolii* Esp.
Broad-bordered Five-spot
Burnet

216 *Zygaena trifolii* Esp.
subsp. *palustris* Ob.
Marsh Five-spot Burnet

217 *Zygaena loniceræ* Scheven
Narrow-bordered Five-spot
Burnet

218 *Zygaena filipendulae* L.
Narrow-bordered Six-spot
Burnet

219 *Zygaena filipendulae* L.
f. *degenerata* Trem.
(*hippocrepidis* Tutt, nec
Hübn.)
Broad-bordered Six-spot
Burnet

PROCRINAE

*220 *Procris globulariae* Hübn.
Scarce Forester

221 *Procris statice* L.
Common Forester

222 *Procris geryon* Hübn.
Citrus Forester

SESIIDAE

SESIINAE

*223 *Sesia apiformis* Clerck
Poplar Hornet Clearwing

*224 *Sphecia bembeciformis* Hübn.
(*crabroniformis* Lew.)
Osier Hornet Clearwing

AEGERIINAE

*225 *Sciapteron tabaniformis* Rott.
(*vespiformis* Westw.)
Dusky Clearwing

*226 *Aegeria scoliaeformis* Borkh.
Welsh Clearwing

- 227 *Aegeria sphecoformis* Schiff.
White-barred Clearwing
- 228 *Aegeria andrenaeformis* Lasp.
Orange-tailed Clearwing
- 229 *Aegeria tipuliformis* Clerck
Currant Clearwing
- 230 *Aegeria flaviventris* Staud.
Sallow Clearwing
- 231 *Aegeria conopiformis* Esp.
Dale's Oak Clearwing
- 232 *Aegeria vespiformis* L.
(*cynipiformis* Esp.)
Yellow-legged Clearwing
- 233 *Aegeria myopaeformis* Borkh.
Small Red-belted Clearwing
- 234 *Aegeria culiciformis* L.
Large Red-belted Clearwing
- 235 *Aegeria formicaeformis* Esp.
Red-tipped Clearwing
- 236 *Aegeria muscaeformis* Esp.
(*philanthiformis* Lasp.)
Thrift Clearwing
- 237 *Aegeria chrysidiformis* Esp.
Fiery Clearwing
- *238 *Dipsosphesia scopigera* Scop.
(*ichneumoniformis* Schiff.)
Six-belted Clearwing
- *246 *Fumaria casta* Pall.
(*intermediella* Bruand)
Shining Sweep
- 247 *Fumaria scotica* Chapman
Scottish Sweep
- 248 *Fumaria crassiorella* Bruand
Bond's Sweep
- *249 *Proutia eppingella* Tutt
Epping Sweep
- 250 *Proutia betulina* Zell.
Birch Sweep
- 251 *Proutia salicolella* Bruand
Bruand's Sweep

TALAEPORIINAE

PSYCHIDAE

PSYCHINAE

- *239 *Canephora unicolor* Hufn.
(*graminella* Schiff.)
Opaque Sweep
- *240 *Pachythelia villosella* Ochs.
(*nigricans* Curt.)
Black Muslin Sweep
- 241 *Pachythelia opacella* H.-S.
Dusky Sweep
- 242 *Pachythelia muscella* Hübn.
Plumose Sweep
- *243 *Sterrhopteryx fusca* Haw.
(*hirsutella* Hübn. nec Schiff.)
Brown Muslin Sweep
- *244 *Whittleia reticella* Newm.
Netted Sweep
- *245 *Epichnopteryx pulla* Esp.
(*radiella* Curt.)
Transparent Sweep
- *252 *Luffia lichenosa* Geoffr.
(*lapidella* auct.)
Summer Grey Smoke
- 253 *Luffia ferchaultella* Steph.
(*pomonae* Staint.)
Dark-grey Virgin Smoke
- *254 *Bacotia sepium* Spey.
Shining-brown Smoke
- *255 *Narycia monilifera* Geoffr.
(*melanella* Haw.)
White-speckled Smoke
- 256 *Narycia marginepunctella*
Steph.
(*herminata* Tutt)
Dotted-margin Smoke
- *257 *Talaeporia tubulosa* Retz.
(*pseudobombycella* Hübn.)
Pale-chequered Smoke
- 258 *Talaeporia douglasii* Staint.
Douglas's Smoke
- 259 *Talaeporia staintoni* Wals.
(*conspurcatella* Staint. nec Zell.)
Stainton's Smoke
- *260 *Solenobia inconspicua*
Staint.
Spring Grey Smoke
- 261 *Solenobia lichenella* L.
Linnaeus's Virgin Smoke
- 262 *Solenobia triquetrella* F.R.
Speckled Smoke

COSSIDAE**ZEUZERINAE**

- *263 *Phragmataecia castaneae*
Hübner.
Reed Leopard

- *264 *Zeuzera pyrina* L.
Wood Leopard

COSSINAE

- *265 *Cossus cossus* L.
(*ligniperda* F.)
Goat

Super-family HEPIALOIDEA**HEPIALIDAE****HEPIALINAE**

- *266 *Hepialus humuli* L.
Ghost Swift

- 267 *Hepialus sylvina* L.
Wood Swift

- 268 *Hepialus fusconebulosa* Deg.
(*velleda* Hübner.)
Map-winged Swift

- 269 *Hepialus lupulina* L.
Common Swift

- 270 *Hepialus hecta* L.
Golden Swift

(To be continued)

RECENT LITERATURE

Annual Review of Entomology, Vol. 4, 1959. Palo Alto. Calif. pp. vii; 467. Cloth. Price in U.K. £3 3s.

This excellent publication is now in its fourth year and we take pleasure in again stating the contents of the current volume: 'Insect Blood Cells', V. B. Wigglesworth; 'Culture of Insect Tissues', M. F. Day and T. D. C. Grace; 'Pheromones (Ectohormones) in Insects', P. Karlson and A. Butenandt; 'Insect Pigments', R. I. T. Cromartie; 'Taxonomic Problems with Closely Related Species', W. J. Brown; 'Ecology of Cerambycidae', E. G. Linsley; 'Biology of Aphids', J. S. Kennedy and H. G. L. Stroyan; 'The Biology of Parasitic Hymenoptera', R. L. Doutt; 'Bioclimatic Studies with Insects', P. S. Messenger; 'Ethological Studies of Insect Behaviour', G. P. Baerends; 'Experimental Host-Parasite Populations', T. Burnett; 'Biological Control of Weeds with Insects', C. B. Huffaker; 'Microbial Control of Insect Pests', Y. Tanada; 'On the Mode of Action of Insecticides', P. P. W. Winteringham and S. E. Lewis; 'Biological Assay of Insecticide Residues', S. Nagasawa; 'Deciduous Fruit Insects and their Control', M. M. Barnes; 'Seed Treatment as a Method of Insect Control', W. H. Lange Junr.; 'Fleas and Diseases', W. L. Jellison; 'Insects and the Epidemiology of Malaria', P. F. Russell.

LYCIA HIRTARIA (CLERCK) AB. NIGRA COCKAYNE IN
NORTH LONDON (LEP., SELIDOSEMIDAE)

I should like to record the capture of a male specimen of *L. hirtaria*, ab. *nigra*, Cockayne in my garden on 14th April, 1959. Although there is a possibility that this may be a released specimen, the form having been bred in quantities, there is also a good chance that it may be profiting from its cryptic advantage, and that we may see it in increasing numbers in future years.

R. I. LORIMER.

8 Southway,
Totteridge, N.20.

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